The Builder.

VOL. XLIV. No. 2090. SATURDAY, FEBRUARY 24, 1883.

ILLUSTRATIONS.

Plans of Fillongley Castle and Croxall Mound 244
House at Finchley.—Mr. Thomas Newell, Architect 246
The New Stadttheater, Brünn (Double-page Engraving).—Herren Hellmer and Fellner, Architects 248, 249
New Entrances to St. James's Hall, Piccadilly.—Messrs. Emden & Co., Architects 251
Houses in Bell Yard, Fleet-street.—Messrs. Isaacs & Florence, Architects 253

CONTENTS.

The Autobiography of James Nasmyth 231
Wagner 233
A Popular Work on the Renaissance 233
From Abroad 234
New Paris 235
The Sanitary Condition of Houses in the Country 236
The Mosque of Cordova and Kairwân: Royal Institute of British Architects 237
Notes on Professional Practice: Architectural Association 238
St. Kew Church 240
Northern Architectural Association 240
Stone of Westminster Abbey 240
The Late Mr. Wm. Snooke 240
Fillongley 241
Croxhall Mound 241
House at Finchley 242
The New Stadttheater, Brünn 242
London Street Architecture: Bell-Yard, Fleet-Street 242
New Entrance Front, St. James's Hall, Piccadilly 242
The Process of obtaining Sanction for Public Works in Great Britain 255
Decoration of the Dome of St. Paul's 257
Portland Cement Concrete 257
The Construction of Theatres 258
Examinations at the Surveyors' Institution 258
Progress of Telegraphy 258
Birmingham Architectural Association 258
The Teaching at Schools of Art 258
The Painting and Decorating Trade and its System 258
Blackmore Park 258
Tabular Statement of the State of Trade and the Labour Market 259
The Sanitation of Russian Towns 260
Building Patent Record 260
A Concrete Vault for Heavy Loads 261
The New Technical College at Finsbury 261
House Decorators' Club and Institute Company 261
Smoke and Westminster Abbey 261
An Appeal to the Benevolent 262
Book-Keeping Competition 262
Gas *v.* Vegetation 262
Church-Building News 262
Miscellanea 262

The Autobiography of James Nasmyth.

NO portion of the duty of the public writer is more anxious, more solemn, and too often more sad, than that which calls upon him to inscribe in his columns the name of some distinguished man whose works on behalf of his fellows have reached their close. It may be the case of a brother student, artist, or workman, struck down in the prime of his vigour; it may be that of the ripe in-gathering of some grey-headed teacher to whom he has been wont to look up for a lifetime. Early or late, the loss comes always too early; and very often the sense of that loss is so profound as to render its expression as difficult as it is painful.

How many occasions of this kind have occurred since the *Builder* first was called into existence! How many even of late years! Whether we have ourselves taken up, with brief but earnest touch, the pen of the biographer, and have put on record a few words as to Barry, Street, Burton, or other distinguished and lamented architects; or whether, under the more impersonal form of reviews, we have spoken of the biography or the autobiography of such men as Brunel and of Brassey, of Rennie and of Fairbairn, a feeling of personal regret has tinged the page. With all the more satisfaction do we hail the occasion of introducing to our readers the narrative of a life long distinguished by its devotion to the service of mankind,—one still rich in vigour, as well as in happiness and in honour.*

The main difficulty that we experience in attempting to give our readers some idea of the life of James Nasmyth lies, not so much in selecting what to say, as in choosing what to leave unsaid. The life was so full, the paths in which the subject of our remarks made his way to distinction were so varied, the hobbies which he rode on holiday seasons were so indistinguishable from the plodding business hacks which did him such faithful work, that we labour under an embarrassment of riches. Let us try to take, in the first instance, such an aspect of the life of James Nasymth as may be most instructive, as well as most interesting, from the builder's point of view.

Born at Edinburgh on the 19th August, 1808, James Nasmyth was the son of Alexander, and the younger brother of Patrick, Nasmyth, each of them well known as a painter. "My father," he says,—he elsewhere says that he was called the father of landscape painting in Scotland,—"did not confine himself to landscape painting, or to the instruction of his classes. He was an all-round man. He had something of the universal about him. He was a painter, an architect, and a mechanic." The late David Roberts, himself a scene-painter of the highest character,—said that his style was founded on that of Nasmyth. Stanfield was another of his friends. On one occasion Stanfield showed him his sketch-book, observing that he wished to form a style of his own. "Young man," said Nasmyth, "there's but one style an artist should endeavour to attain, and that is *the style of nature*; the nearer you can get to that the better." Alexander Nasmyth was addressed as "architect," by the magistrates of Edinburgh. He was the designer of the Dean Bridge, which spans the deep valley of the Water of Leith, north-west of the New Town, and was professionally engaged in laying out the streets of this part of the city. A temple to the Goddess of Health, erected over St. Bernard's Well, and a design for Nelson's monument, are specimens of the taste of Alexander Nasmyth which form two of the beautiful illustrations of the Autobiography.

Michael Nasmyth, the great-great-grandfather of James Nasmyth, was born in 1652, and dwelt in the Grass Market, Edinburgh, in which city he established a business as architect and builder. The name and lineage date from the fifteenth century, and on page 3 of the Autobiography will be found a spirited sketch by the autobiographer himself of the scene in which the name had its origin. Sir Michael Nasemyth, Chamberlain of the Archbishop of St. Andrew's, obtained the lands of Posso and Glenarth by marriage, in 1544. In the fourteenth century a branch of the family settled at Netherton, near Hamilton. The Netherton property was confiscated in the troubles of the reign of Charles II. It is a remarkable coincidence that the ancient crest of the family which produced the inventor of the steam hammer (one of the most formidable implements of the modern Vulcan), should be a dagger between two broken hammer-shafts.

A draughtsman of rare ability, James Nasmyth has thus an undoubted right to say "our history begins long before we are born." The hereditary culture of art, and its effect in giving power to the hand, is well illustrated in this gifted family. Few things are more sure than that facility in the use of the implements, either of war or of peace, is a distinctly heritable quality, although, of course, susceptible of improvement by culture, or of loss by neglect. Speaking of the delicate needlework of his grandmother,—Mary Anderson was her maiden name,—Mr. Nasmyth says, "I am fain to think that her delicate manipulation in some respects descended to her grandchildren, as all of them have been more or less distinguished for the delicate use of their fingers, which has so much to do with the effective transmission of the artistic faculty into visible forms. . . . I can not look at my grandmother's sampler without thinking that she had much to do with originating the Nasmyth love of the fine arts, and their hereditary adroitness in the practice of landscape and portrait painting, and other branches of the profession." We altogether agree with this view of Mr. Nasmyth, and are convinced that it requires several generations to admit of the training of the hand to art. The case of Charlemagne should not be forgotten. That great soldier and legislator is said never to have been without a copy-book at hand, by the aid of which he improved his odd moments in endeavouring to perfect his handwriting, without, however, ever getting beyond a childish scrawl. The neglect of the cultivation of drawing, as an essential element of almost primary education, is one of those grave oversights of our own educational reformers and legislators which does more to keep the workman's children down than most of the board school *curriculum* does to raise them up.

We have been for many years acquainted with the extreme delicacy, as well as force, of the drawings which James Nasmyth turns out with his left hand. In accuracy of delineation they more closely resemble the work of George Cruikshank than any that we can at the moment recall. The grotesque element, however, of which Cruikshank was so well-known a master, is alien to the gentle temper of Nasmyth, from whose pencil come most of the hundred illustrations that adorn the Autobiography. What force do these delicate drawings lend to such a remark as this?—"There was one point which my father diligently impressed upon his pupils, and that was the felicity and the happiness attendant upon pencil drawing. He was a master of the pencil, and in his off-hand sketches communicated his ideas to others in a way that mere words could never have done. It was his graphic language" (p. 57). We advise our readers carefully to study the paragraphs in which James Nasmyth again and again returns to the subject of the utility of a command of the pencil, as well as of the delight which the pursuit yields to its followers. More than any man we can name he thought pencil in hand. That used, the art tool becomes more than an instrument of record. It not only perpetuates and communicates thought, it aids in the process of thinking. On p. 298 will be found "an order for dinner" which, at Upsala in 1842, Nasmyth, unable to speak a word of Dannemora Swedish, made perfectly intelligible to his bright, cheery, jolly hostess, who could not speak a word of English. And it is not to what is usually meant by the word sketch, that the work of the pencil should be, or was in the present case, restricted. Careful and

* James Nasmyth, Engineer: an Autobiography. Edited by Samuel Smiles, LL.D. With a portrait by G. Reid, and numerous illustrations. London: Murray. 1883.

exact, when exactitude was requisite, Nasmyth measured the dimensions of his architectural sketches, no less accurately than those of his drawings of machinery. Going to Elgin, in order to provide his father with materials for two paintings commissioned by the excellent brothers Grant, he "made most careful drawings of that noble cathedral. I endeavoured to include all that was most beautiful in the building and in its surrounding scenery. . . . . I did my best to carry away a graphic sketch of the old castle and its surroundings. I had the pleasure of placing in my father's hands the sketches I had made. He was greatly delighted with them. They enabled him to set to work with his usual zeal, and in the course of a short time he was able to execute, *con amore*, the commissions of the brothers Grant" (p. 195).

What sort of tool the pencil may become in hands trained to its employment is well shown in the illustrations of the Autobiography. We call attention to the delicate drawing of a door-head from an old mansion (on p. 83), to the mural crown of St. Giles (p. 74), to the monument to Alexander Nasmyth (p. 231), to the view of Hammerfield, Penshurst (p. 373), and, as a triumph of imaginative architectural design, to the astrologer's tower (p. 344). Let the reader compare those structural drawings (not forgetting the interiors on pp. 323 and 440) with the numerous diagrams and working drawings on the one hand, and with the landscapes and figure-pieces on the other, and he will see how wide was the sweep of Nasmyth's arm. We should like to know exactly how the beautiful drawings of the moon on pp. 331, 332, and 335 were produced. They suggest the aid of photography; but we find (p. 329), "I made careful drawings with black and white chalk on large sheets of gray-tinted paper of such selected portions of the moon as embodied the most characteristic and instructive features of her wonderful surface. I was thus enabled to graphically represent the details with due fidelity as to form, as well as with regard to the striking effect of the original in its masses of light and shade, I thus educated my eye for the special object by systematic and careful observation, and at the same time practised my hand in no less careful delineation of all that was so distinctly presented to me by the telescope at the side of which my sheet of paper was handily fixed." We rather think that the clear definement and sudden contrast of light and shade in the illustrations that we have cited are superior to those which the borrowed light of the moon would produce through the agency of the camera; and that they represent the surface of the planet as seen through a powerful telescope, and drawn after nature. The vertical shading of the plane parts of the view of lunar mountains and extinct volcanic craters on p. 335 certainly denotes mechanical, as distinct from photographic, treatment. In a second edition (which is certain to be very soon demanded) we hope that Mr. Nasmyth will add a note as to the process by which these very beautiful views have been brought before his readers. The same remark applies to the drawing of the sun spots (p. 384). We also call attention to the quaint beauty of the "extemporised shower-bath"; which will recall to many of our readers one of the finest of Doré's illustrations of "Paradise Lost." But we owe no small apology to Mr. Nasmyth for the suggestion. Neither artist, we feel sure, can have taken the hint from his brother, and the nude figure in the "Paradise Lost" represents the impersonation of the last character to whom it is appropriate to refer in speaking of James Nasmyth.

It will, we think, be clear to the readers of the Autobiography that James Nasmyth had in him the makings of an architect of no inferior order. As to a draughtsman, he had more than the makings, he had the thing made. But this rare gift of the power of the pencil,—like others of which he says nothing,—seems only to be regarded by the autobiographer as one of the elements of his success as an engineer. "It was in the year 1817," says our author,—he was then nine years old,—"that I had the pleasure, never to be forgotten, of seeing the great engineer, James Watt. He was then close upon his eighty-second year. His benevolent countenance and his tall-built figure made an impression on my mind that I can never forget. It was even something to have seen for a few seconds so truly great and noble a man." The impression then produced on the boy seems to have aided in turning his attention from a passion for the collection of views to mechanical pursuits. His ideas were formed, and his mechanical education was half unconsciously commenced, among the lathes and tools of his father's work-room. Spinning tops, "peeries," and "young cannon,"—then fashionable playthings among the small people of the High School,—were his earliest productions. Flying kites and tissue-paper balloons were articles that he was famed for producing. To the maintenance of the perfectly still and steady position of a kite when at the highest flight in the air anxious thought and special skill were devoted. Nasmyth says nothing of the tail of his kites. We conclude that he did not anticipate the admirable flight of the Chinese bird kites, which are unprovided with those cumbrous appendages, and which owe their soaring powers to certain little open pockets left in the wings. And here we may mention, for the sake of our younger readers, the splendid effect that may be produced by a hexagonal kite, each sector of which is fastened to a lath radius on one side, and left free on the other. The periphery of the hexagon may be formed of string. This kind of kite requires to be raised by a leader, or upper kite, and when up, revolves with great rapidity, — forming a capricious and beautiful object. The only difficulty is the need of providing strong steel swivels, without which it very soon twists the line in two.

"Jemmy Paterson" and "Tom Smith" were two of Nasmyth's cronies at the High School. The first opened to his comrade the foundry and workshop of his own father. The father of the second had a special genius for chemistry. Thus did the boys become fathers of the men. At seventeen James Nasmyth began with making a small working steam-engine, for the purpose of grinding the oil-colours used by his father in his artistic work. "The result was quite satisfactory. Many persons came to see my active little steam-engine at work, and they were so pleased with it that I received several orders for small working engines, and also for some models of steam-engines to illustrate the subjects taught at mechanics' institutes."

At twenty-one, James Nasmyth had the good fortune, on the strength of the models, and the mechanical and perspective drawings, which he had by that time completed, to be engaged as a personal assistant to Henry Maudslay, head of the well-known firm of manufacturing engineers in London. The account of his introduction is too long to extract, and too charming to condense. No position could have more advantageously tended to foster and bring out the strong mechanical genius of the young man. At that time our primary mechanism had not generally advanced beyond the condition of the village blacksmith's work. No rules or normal dimensions had been laid down for screws, bolts, nuts, or any other of the numerous and constantly recurring elements of machinery. Thus if a bolt was broken, in an important machine, work had to stop while another was made and fitted, to replace it. The very first job that fell to Nasmyth, on commencing his attendances at Maudslay's workshop was to assist in the details of "a machine for generating screws." "This beautiful and truly original contrivance became, in the hands of its inventor, the parent of a vast progeny of perfect screws, whose descendants, whether legitimate or not, are to be found in every workshop throughout the world where first-class machinery is constructed."

There were, however, other legitimate lines of mechanical descent which should not be forgotten. It was in the latter part of 1831 that Nasmyth commenced that business on his own account which not only provided him with an adequate fortune by the early age of forty-eight, but furnished our dockyards and arsenals with the most formidable and useful tool ever wielded by the servants of Vulcan. But in 1817 a man of not unlike acquirement had established, in High-street, Manchester, "a miserable shed, containing a single lathe, which the two partners made with their own hands, and which was turned by their one workman, a muscular Irish labourer." From this modest beginning sprang the important and lucrative business which was transferred to the "Fairbairn Engineering Company, Limited," in 1864. Again, the life of Sir Joseph Whitworth is yet a desideratum. He was elected a member of the Institution of Civil Engineers in 1841, but did not enrich the annals of that important society with any communications of earlier date than 1860, when he exhibited a model of his rifled cannon at a meeting of the members. His little book on "Guns and Steel" is dated in 1875. But in those very departments of exact measurement and exact execution of work, to which Nasmyth justly attaches so much importance, Whitworth must have been a contemporary labourer, and that with a fidelity, genius, and success second to no man living. And the Nestor of the profession, John Ericsson, K.V., born in 1803, came to England in 1826. Of his early life here we find no record, either in the article on his name to be found in *Scribner's Monthly Illustrated Magazine* for April 1879, or in the magnificent quarto "Contributions to the Centennial Exhibition," by John Ericsson, LL.D. (New York, 1876), one of the most splendid volumes on mechanical subjects that ever issued from the press of any country. But in 1829 Ericsson's locomotive, the "Novelty," was a competitor for the prize offered by the Liverpool and Manchester Railway Company, and far exceeded in speed, although not in stability of workmanship, Robert Stephenson's "Rocket," which obtained the 500*l.* prize. Certainly in 1833, probably some years earlier, Ericsson was in partnership with John Braithwaite, at the well-known engineering works in the City-road. He must, we think, have been at work at Warrington at the time that Nasmyth established himself at Manchester. We refer to these matters, not as in the least affecting the claims of Nasmyth to originality, as well as to admirable simplicity and finish of work, but as showing that about the same time the attention of more than one man of genius was specially bent on this very object of making self-acting tools, and of introducing into our manufacturing metallurgy that system to which we are so much indebted for the advance of our practical science. To the names of Ericsson, Stephenson, Braithwaite, Fairbairn, and Whitworth as honourable rivals of Nasmyth, we may add those of the Bramahs, who introduced the same exquisite accuracy of detail into his hydraulic presses, his locks, and other productions. Sir Charles Fox, referred to in the autobiography (p. 435) as a personal friend, had been educated for the medical profession, but commenced his engineering career in the workshop of Ericsson, and afterwards, in partnership with J. J. Bramah, founded the London works at Smethwick, near Birmingham, where the ironwork of the Crystal Palace was prepared.

A chronological list of as many as forty mechanical inventions and technical contrivances, children of the fertile brain of Nasmyth, is appended to the volume. It is extremely interesting to be able to trace the origin of some of these plans, although it is quite possible that they may have been independently invented by different men. The mode of applying steam power for the traction of boats which (without date) is put first, is now in constant use on some of the German rivers. To the American dentist's drill, in which rapid rotary motion is given to a point, which can, at the same time, be guided and applied where required, we have, we think, previously called attention, as one of the greatest triumphs of mechanical genius. We were unaware before that it was an invention of Nasmyth's. The safety foundry-ladle was a great boon to the metallurgist. But the invention by which the name of James Nasmyth will be chiefly immortalised is that of the steam hammer. The account given (p. 239) of the conception and the early testing of this most important tool deserves careful study. It is a very rare instance of an invention, not casually arrived at, but thought out, within a definite and short space of time, for the accomplishment of a definite task. In 1839 there was not a forge-hammer in England or Scotland powerful enough to forge a paddle-shaft of the size that Mr. Brunel required for the *Great Britain* steamer! A photograph of the first drawing made by Nasmyth to supply this serious want is given on p. 241; sketched, the author tells us, in little more than half an hour after his attention was called to the subject. So complete was the drawing that, in April, 1842, Nasmyth, to his no small surprise, was shown a steam hammer, made from his design, at work in the great French engineering establishment at Creuzot. M. Bourdon, one of the partners of that establishment, had been shown Nasmyth's drawings by his partner, Mr. Gaskel, and, while no one in England had realised what a mighty agency was thus offered to the forge, had quietly gone home and made one. Nine

men out of ten would have raised a loud outcry as to piracy. Nasmyth seems only to have been charmed with the compliment! "On inspecting the steam hammer, I found that Bourdon had omitted some important details which led to a few mishaps. I sketched for him, there and then, in full size on a board, the elastic packing under the end of the piston rod, which acted, as I told him, like the cartilage between the bones of the vertebræ, preventing the destructive effects of violent jars. I also communicated to him a few other important details which he had missed in his hasty inspection of my design. Indeed, I felt great pleasure in doing so; as I found Bourdon to be a most intelligent mechanic, and thoroughly able to appreciate the practical value of the information I communicated to him."

As far as our reading goes, the above anecdote is without a parallel in the annals of science. Too often devoid of that practical prudence which is necessary for the acquirement of riches, inventors are, as a rule, an irritable genus. To complete the work of the pirate was, indeed, a noble forgiveness of the theft! It is some comfort to learn that after this, Nasmyth took out a patent for the steam hammer, both in England and in the United States. It must be remembered that M. Bourdon had rendered this step impossible in France. The Russian Government ordered one of these implements twelve months before the English Admiralty did so! The whole of the history of the steam hammer is of the greatest interest, whether as illustrating the genius of the engineer, or the character of the man. Nor can any one hesitate to accept the testimony, "without entering into further details, the steam hammer has advanced the mechanical arts, especially with relation to machinery of the larger class, to an extent that is of incalculable importance."

Dr. Smiles has contributed a short preface, and says that he was requested by Mr. Nasmyth not to spare his pruning knife in preparing the autobiography for publication. It is, however, impossible to distinguish to what extent the work, as it comes before the public, may be indebted to the editor. There are, we must add, not a few errors in slight matters of spelling and of grammar, as to which it is unnecessary here to say more than that we hope they will be removed from the text of future editions of this charming work.

WAGNER.

LAST week witnessed the close of what all must admit to have been a very extraordinary artistic career. We use that adjective advisedly, inasmuch as Wagner was not a musician pure and simple, and if regarded in that light alone his claim to rank as a great genius would be much more questionable than it is. He has left but little music which, as music, apart from any of its associated effects, would attract many admirers, or stand the test of criticism in regard to form and construction. Nor did he, in fact, profess to aim at this. What he did was to discard the idea of using music as an artistic form complete in itself, to which, in lyric drama, the conditions of the poetry and the action were to be subordinated, and to regard and treat the whole of the elements of lyric drama, the poem, the music, the scenery, and the action, as a combined form of art, whole and complete only when so regarded, and in which each element of the effect was to be considered in relation to the others, and to the combination of all towards one grand *ensemble*. In promulgating this view, he allowed himself, as all ardent reformers in art do, to indulge in very one-sided and unjust depreciation of the work which had been previously effected upon the basis of what he considered a partial and incorrect theory. All lyric drama before his own, in fact, was to be considered as abortive failure. It is more than doubtful whether such a judgment could be justified even in regard to the logical question of the relation of the music to the drama in such operas as Mozart's, for instance. All opera, all stage art, is more or less conventional; the attempt at absolute realism on the stage has generally been felt to be a failure in regard to the higher objects of the drama, whether lyrical or spoken; and the ideal in regard to the proper degree of conventionality has varied very much at different times, and in the minds of critics equally competent, but swayed by different views as to artistic principle. Goethe, for instance, when in his younger days he not only wrote for but superintended the Weimar stage, was so strongly impressed with the necessity of a high degree of convention, that he would not even allow the actors to assume a natural grouping on the stage, or to act directly to each other, but compelled them to stand in a symmetrically-arranged rank or semicircle, and deliver their speeches rather to the audience than to each other. We, in the present day, should consider such a system of stage management as painfully formal and ineffective, but it does not follow that Goethe was wrong from his own point of view, only that his idea of the object of drama was different from ours. Similarly, it can hardly be said that the Mozart form of opera was necessarily deficient or artistically incorrect, but only that Mozart and his compeers took a different view of the relation of the music and the drama, and regarded the latter as furnishing characters and situations which were to be the suggestions and incentives to musical expression. The pleasure to be derived from this school of lyric drama is more musical than dramatic; that to be derived from the Wagner school is more dramatic than musical, save in some exceptional scenes here and there; and it will always probably remain an open question whether the highest enjoyment is derived from opera in which the musical development, though paramount, is so beautiful as to furnish the highest musical enjoyment, even apart from its place in the opera, or from that in which the music is more closely blended with, and even subordinate to, the action, but is not of such intrinsic beauty and completeness as to confer a pure enjoyment apart from the stage. What is unquestionable, however, is that Wagner has conferred a distinct gain on the world by initiating a new form of lyric drama instead of merely working on the lines of an old form, and has, by this means, achieved a position as a creator in art which he probably would not have achieved as a musical composer in the old signification of the word. In place of the elaboration of musical expression at certain salient points of the story, connected by passages of semi-musical speech ("recitative"), he has worked out a form of musical drama in which the poem, and not the music, takes the first place, and in which the musical expression and the action are simultaneous in progression, and cohere throughout the work. This of course means the cutting short of the musical development, for which repetition and extension are necessary; and he seems to have been led by the feeling of this necessity to the endeavour to expand the power of the musical expression in another direction, that of instrumental effect, or what is called among musicians "orchestral colouring"; he has given great novelty and intensity to the effect of the orchestra as a whole; and the part played by the band in his operas is that of a stream of richly-toned continuations of sound, varying with the lights and shadows of the drama, and with the contrasted characters of the personages on the stage.

This is practically almost a new form of art; at the least, the suggestion for a new point of departure, of great interest and importance. It is not likely that the works he has actually produced will have the great and permanent interest which the enthusiasts of the school anticipate. It is unquestionable that there are great drawbacks to any permanent and widespread admiration for these works in their present form: drawbacks consisting in deficiency of beauty and clearness of form in the music, in the absurdities and extravagances of the poems and of many of their incidents, in their inordinate length, and in the monotony and frequent repetition of effect which cannot but be felt,—which certainly was felt very strongly, far more strongly than was anticipated, by a large proportion of those who were present at the performance of the "Nibelung's Ring" in London last season. It must be felt, too, that a good deal of the musical effect is of that order which appeals to the nerves rather than to the intellect; it is a sensuous art, like that of Rossetti's paintings. Whatever may be the future of Wagner's productions, however, his influence will be felt on the lyric drama of the future (if there is to be any), in leading to a more thoughtful consideration of the relation between the poem and the music, and rendering it impossible for composers to be content, as Rossini was, with setting to music any sort of *libretto*, so long as it will give occasion for the requisite number of airs for the requisite number of leading singers.

Some of the characteristics of Wagner's speech and habits, which have become public both before and since his death, render it impossible to doubt that there was a very strong vein of charlatanism in his nature, and there can be no question that, by his own pen and those of his sworn admirers, he carried the art of blowing his own trumpet to a point which has seldom been equalled. On the other hand, it is impossible not to admire, though with reservation, the indomitable will and energy by which he succeeded in forcing himself upon his generation in the teeth of the opposition of almost all Europe,—a quality which is in itself a great element of genius.

A POPULAR WORK ON THE RENAISSANCE.

IT is one of the unmistakable signs of the turn which public taste in this country has taken, that books in illustration of the Renaissance period multiply so fast at present. The rapidity of the change is bewildering when we reflect how short a time since it is that Mediæval art was everything, and that men so popular and successful among modern architects as Pugin were pouring forth all the contempt that words could express against the period which produced St. Peter's and the Florentine palaces. The work which now claims our notice * is intended as an introduction to the study and knowledge of this period of art, more general and popular in style than others which have appeared. The author says in his preface, "The subject of the Renaissance has been treated by many authors and in various spirits. Mr. Symonds has written a scholarly treatise, taking up its moral, literary, and artistic aspects, each from its separate point of view. Burckhardt has treated of it politically, and with a vast amount of erudition. Mr. Pater has analysed certain fragments; and Mr. Ruskin has woven about it a maze of golden thoughts, drawing some of his most telling comparisons and contrasts between Northern and Southern art." The present author excuses himself for occupying ground previously trodden by such able writers, by the conviction that a more practical and homely view may be useful to a large class of readers "in tracing the many ramifications of art from their parent stock, and in bringing to a focus the different elements composing that complex movement which we call the Renaissance." We are not, as a rule, very much in favour of "popular and practical" treatises on art, which too often may be equally described as partial and superficial. Mr. Scott's volume appears, however, to be an exception to this tendency, and to be at once "popular" (in the sense of being easily intelligible and avoiding too fine-drawn criticism), and trustworthy as a broad general indication of the history and characteristics of the art of the Renaissance. The author, indeed, disclaims for it any so serious an aim as would be implied in the title "a history"; it is rather, he says, a "pictorial guide" through the intricate mazes of the artistic history of the extraordinary period which is dealt with. A quarto volume of more than 350 pages, very copiously and variously illustrated, and written with an adequate knowledge of the subject, may fairly claim its right of existence on such terms.

Mr. Scott starts with the view that architecture is the central art, as leading to and affording place and opportunity for all the others. He gives one practical illustration of this, which is not always noticed, viz., that in the first great era of the Renaissance every one of the nine great architects was also a sculptor; in the second era, of the five leading architects two were also sculptors; while of the eleven professed sculptors, only one,—Ghiberti,—was also an architect, and he not a very successful one. He divides architecture into four main groups,—Military, Religious, Civil, and Domestic, taking their rise chronologically in the order named. Of these, the second is the chief exponent of style, as the class of architecture which rises most above material considerations, and into which, accordingly, the architect has most encouragement and opportunity to put his best thoughts. The critical definition of the phases of Italian architecture

* The Renaissance of Art in Italy: an Illustrated Sketch by Leader Scott. London: Sampson Low & Co. 1883.

in the early days of the Renaissance is very correctly and, at the same time, picturesquely put, especially in regard to the early Lombard churches, with their profusion of sculpture, in which was represented the wild and fierce imagination of the Teutonic element, which, in the early Renaissance days, or rather, the days immediately preceding the Renaissance, exercised such a sway, political, social, and military, over the North of Italy; a subject on which some of the most vivid and striking lights are thrown in various passages in Browning's "Sordello," which same poem reminds one of another point touched on by the author in allusion to the civil architecture of the period; namely, the effect which must have been imparted to the towns by the universal use of towers as adjuncts to every dwelling of importance, at a time when every man's house might have to be literally his castle, and a tower for outlook and for commanding the assailants was a practical necessity. In the tenth century Pisa, Siena, and Florence had each several hundred towers; and thus Browning, who understands that period so well, represents the Pope's legate before he was admitted inside Ferrara, which was in the hands of Ecelin's general, as wondering where all the steeples had gone,—

> "A-tiptoe o'er the fosse
> Look'd Legate Montalungo wistfully
> After the flock of steeples he might spy
> In Este's time, gone (doubts he) long ago
> To mend the ramparts."

Mr. Scott mentions San Gemignano as the only place where the reality of a town of towers is preserved intact to this day. "After the feudal times the tower interest centres in the campanile which adorns every city." Whether we should agree with him on the judgment that the Italians excel all nations in tower-building is another question. The Italian campanile at its best is a very fine and characteristic form of tower architecture, but Ruskin set a fashion of somewhat overpraising it; some of the finest examples are rather impressive by their size, their height, than their design; and a good many of the more average specimens are elegant indeed, but not powerful-looking architecture. The characteristics of the Italian architecture of the first Renaissance era, of the days of Cimabüé and Giotto, are well described and sufficiently illustrated by engravings; the development of the peculiarly characteristic Italian façade, the ornamental mask of the real building, is touched upon, and a parallel is suggested between the sculptures of Orvieto and Wells executed about the same time. One of the comments on Orvieto, however, is misleading; the author says, "how different the mode of working was with those earnest artist-architects to that of the present day! A modern sculptor carves his ornamentation on thin marble panels, and faces the brickwork with them,—they are, in fact, only an extraneous ornament. The sculptors of Orvieto built up their façade in solid marble blocks, dovetailing one into another with such precision that they produced a perfectly smooth surface, on which they hewed out their conceptions fresh from their earnest minds. The 'Expulsion from Paradise' is carved right over some joints." This is a little bit of what we should call sub-Ruskinesque rhetoric. Can Mr. Scott say how the sculpture was the better for being carved over the joints? And if he means to convey the idea, which to uninformed readers the passage would convey that the Italian marble architecture of that period was remarkable for its solidity, what of the Duomo and Campanile of Florence, which come into the same chapter? It is, in fact, the most notorious defect of the Italian quasi-marble architecture of the Renaissance, that it is a veneering only, and often a very thin one, and Mr. Scott's enthusiasm has led him into conveying to his readers an idea about Italian architecture which is the reverse of the true one, in that particular.

In speaking of the "mosaic and metal work" of the early period, the author notes that mosaic is a mode of expression which "seems to belong to a low state of art." This will appear a very erroneous judgment to some, but in regard to the representation of the figure it may be said to be true both critically and historically. As to the latter, he points out that in Rome mosaics only came into favour when artistic feeling was dying out, and when more attention was given to the richness and cost of material than to the excellence of art. A great many of the Roman mosaics that have been preserved represent, in fact, the kind of art which, as practised in the later days of the Renaissance, has been called "Rhopography," which in the vernacular may be rendered "the painting of rubbish," incongruous collections of articles worthless and uninteresting from an artistic point of view; and, "in Florence," he observes, "we hear of very few artists who worked in mosaic after the thirteenth century, until in the decline under the luxury of the Medici, when Florentine mosaic arose, and precious stones and marbles were again made a means of pictorial expression. The hardness and impliability of the material forbids its use in the expression of the highest art." This is certainly true: mosaic recommends itself strongly as an architectural decoration from its splendour of surface and its durability, but its successful use in figure subjects can only be realised when these are simple and severe in style, and seen from a considerable distance. The attempt at a too natural and varied expression in the figures brings into prominence the unyielding nature of the medium; a fact which is not perhaps sufficiently kept in mind at present, when there is so much talk about the use of mosaic decoration on a great scale.

The second era commences architecturally with Brunelleschi, upon whose character the author is rather severe, as being selfish as well as ambitious. We do not quite subscribe to this. Brunelleschi was a man of power in his own profession, which he understood better than most of his compeers; and he liked to have his own way (as many architects do), and had it (as few architects have). He remarks on Brunelleschi's apparent foresight in regard to the coming taste for Classic models in architecture, shown in his giving up so much of his early professional days to study in Rome. The part played by architecture in the third and peculiarly Classical epoch of the Renaissance was, as the author remarks, very important; it seems to have been from the remains of Roman architectural greatness that the impulse was given to literature, rather the other way. The literary remains of Rome had to be sought among the rubbish of monkish libraries, and were only recovered piecemeal, and often by happy chances; the architectural remains were there in the face of day, calling openly for recognition. Mr. Scott's judgment of St. Peter's is more favourable than most architectural critics, even now, will be ready to concur in. He does not seem to be aware of the part which Bramante has almost conclusively been shown to have had in the idea of the building, nor can we profess to understand what he means by saying that Michelangelo "disclaimed the heavy support of Bramante's four piers and removed them, boasting that he would raise the Pantheon in the air." This appears to be nonsense as it stands; the dome is supported on four piers, in which Bramante's original piers, as far as carried out, are incorporated. The sentence would imply that Michelangelo carried the dome on nothing, "which is absurd," as Euclid says; the paragraph seems to have been written hastily, and requires revision. But in the main, in spite of the one or two slips we have mentioned, the architectural portion of the subject is fairly well treated, and that is more than can be said for the treatment of the subject in popular works generally.

The account of the various successive schools of painting is clear and readable, and largely illustrated, and among the illustrations are some reproductions of that interesting class of Renaissance work, the outline engravings, of which the celebrated "Hypteronomachia" furnishes the most remarkable examples, and which throw so much light on the social as well as artistic feeling of the period. Ornamental art is somewhat briefly treated, but perhaps as fully as would be possible within the limits of such a book, the subject being really almost endless. Some very good and not very well known illustrations accompany this part of the work. In the chapter on Intaglio and Cameo work, the author would have done well to have given a distinct definition of the precise meaning of the two words, about which many readers of a popular treatise are likely to be uninformed. In speaking of the works of Titian, in one of the chapters on painting, he seems to be in some confusion of ideas as to the painter's well-known work, "Earthly and Heavenly Love." The correctness of this title has been contested by Messrs. Crowe and Cavalcaselle, who suggest a title which we agree with Mr. Scott in disliking, as it implies a disagreeable and somewhat impure *motif* in the work. We forget whether they also suggested the alternative title, "Virgin and Matronly Love," which seems to us the best description of the work, or whether we ourselves suggested it in reviewing their book a good while ago; it has been suggested in these columns one way or the other. But Mr. Scott, taking the old title, assumes the nude figure to be Heavenly Love and the clothed one the Earthly; and though we quite agree that such an interpretation gives the higher meaning, we certainly never heard it interpreted so, nor do we believe that Titian meant it. His age was too lascivious to have understood such a meaning.

As an example of the tone in which the author considers his subject generally, we quote in conclusion his final paragraph, referring to the possible causes of the decline of the art of the Renaissance:—

"In any great artistic movement there seem to be three stages. The first when art is rare and deemed worthy of the highest offices,—when it is, in fact, the handmaid of religion. The second, when the nation gains wealth and art becomes aristocratic, its tone is lowered, its objects widened; it is not only a teacher and means of fame, but a flatterer and means of wealth,—it has become the handmaid of ambition. The third is when it becomes universal; inferior artists look upon it as a trade, and in the great struggle for patronage,—the supply being by this time greater than the demand,—they strive to get to the front by startling originality, new methods of handling, bizarre mannerisms, and all kinds of illegitimate art. Patrons are as emulous as artists; each seeks to gratify his own taste, high or low, and art falls to the general tone of the age,—it has become the handmaid of ambition.

Thus it happened that the early painters were high-toned and earnest; those of the culmination, sensuous and of high talent,—those of the decline, mannerists and of low motive: the Artist is Child of his Time."

FROM ABROAD.

THE international fine-art exhibition which was opened in Rome towards the close of January has at length assumed a somewhat definite condition of completeness. In spite of the delays accorded, the show was very far from being in readiness when it was thrown open to the public, and no little dissatisfaction was expressed. Whether owing to the serious competition,—for in these commercial days such a word is permissible in speaking of art,—from which in such a city as Rome any exhibition of modern pictures must inevitably suffer, or to other reasons, the first returns of the number of visitors to the Fine-Art Palace erected in the new quarter near the Baths of Diocletian would not seem to point to a very brilliant success. The figures we have seen quoted, of 1,000 visitors daily in the winter season when Rome is crowded, would seem to suggest that the interest cannot be very great. Now that Carnival is over, the last *confetti* thrown, the last *moccolo* put out, and Lent seriously commenced, perhaps the exhibition will, in theatrical language, commence to "draw." After all, perhaps the Romans are right in their indifference, for sad complaints reach us from the banks of the Tiber concerning the condition of Italian art as represented at the exhibition. The simple earnest work of the painters of the Renaissance finds no echo in the heart of the modern Italian artist. The older Italians resignedly agree, with a shrug of the shoulders, that "art is dead"; the modern school have thrown over all the traditions of the past, and hence at the exhibition now open in Rome,—as any one who has had the opportunity of seeing Italian art displayed at our recent international exhibitions can fully understand,—sad are the complaints of the garish exuberance into which the painters of modern Italy have strayed in their study of the great Spanish master, Fortuny. The poetic sentiment of which their country seems the very incarnation, and which has inspired so many a foreign pen and brush, the appreciation of that pathos of neglect so dear to the painter and the poet, and which surrounds each historic site of the Classic peninsula, seems almost entirely deficient, and well can we understand the Italian art-critics bewailing the tendencies of the art of the united Italy of which all good Italians are so proud. Let us hope that Italy will make a more satisfactory show at the Industrial Exhibition which is promised us at Turin for

next year, and for which we learn that the quaint French château-like palazzo Valentino, on the banks of the Po, is being prepared.

It is almost safe to predict that it will be very different with the approaching exhibition to be held in a short time in Amsterdam, the artistic interest in which is daily increasing as fresh promises of the treasures to be displayed are announced from time to time. A project for a generation past discussed, but never carried out, has at length, it is said, been determined on, the union under one roof of the treasures of the Trippenhuis and the Van der Hoop Museum. It is one of the advantages of these international exhibitions, the successful manner in which they stir into emulative life institutions and schemes long neglected; old collections are furbished up, tiresome regulations abolished, and a general preparation made for the reception of the world at large, resulting in a marked improvement for which all future visitors are grateful. In these days of all-invading realism, the still happy band of lovers of the ideal are gleefully looking forward to the treat in store for themselves, the fund of instruction for the world, when next May the treasures of Dutch art will be gathered in the Venice of the North. There are not a few sanguine spirits who look forward to the possibility of a positive revolution being effected in the tendencies of modern art by the study which will once more be devoted to the creations of the great artists of the Dutch school which have rendered the museums of the Hague and of Amsterdam so famous. Those who have visited the so-called land of dykes and canals will be delighted to see once more the scenes which inspired so nobly the brushes of Hobbema and Ruysdael. Those who have never seen the home of the sturdy people whose story Motley has pictured so vividly, will do well to seize this opportunity of visiting the little kingdom which has carved for itself such a niche in the temple of the world's history. In these days when, with red-brick gables rising in every direction, our country is assuming a semi-Dutch appearance, it is scarcely likely that the younger generation of architects will need much inducement to visit a field so rich in the suggestive motives that fill so characteristically the young artist's sketch-book on a ramble abroad.

Exhibitions seem promised us in every direction. Munich is shortly to hold a fine-art exhibition; a minor exhibition of some interest is to be held in Vienna, in April, when an historical collection of works in bronze is to be shown in the rooms of the Œsterreichisches Museum, and rich collections of the Imperial palaces, the Archduke Albert, Prince Lichstenstein, and the Barons Albert and Nathaniel Rothschild, and many other amateurs will be laid heavily under contribution. Though every one is looking forward with interest to our own Fisheries Exhibition, we are promised for a little later in the year, also in Vienna, an exhibition to report on the progress made in electric science within the last few months, an exhibition which will, doubtless, reveal some interesting discoveries.

Among these will undoubtedly take a place the results of the very successful experiments on the transmission of force by electricity, made only a few days ago at Paris, in the workshops of the Northern of France Railway Company, before a distinguished audience of *savants* and scientific men, among whom may be mentioned M. de Lesseps, a large number of deputies, and, representing England, Mr. Wallis, M.P., and Mr. Tennant, of the Great Northern Railway. M. Deprez, two years ago, at the Munich Exhibition, succeeded in showing, in the face of the prediction of scientific men, that force could only be transmitted over about two miles of wire,—that force of half a horse-power could be transmitted some 35 miles with, it is true, a loss of nearly 40 per cent. With the aid of an entirely new dynamo-electric machine of his own invention, — specially adapted to give the utmost tension with the least possible amount of electricity,—M. Deprez has now been able to show how a machine of five-horse-power was able to transmit half of its force over a distance of about 12 miles. Another experiment with a machine of ten-horse-power showed the distribution of half this quantity of force over a distance of 22 miles. The loss of power is found, no matter what the distance, to be about 50 per cent. Serious as is this loss where steam-power is employed, many an at present unemployed and distant waterfall may become immediately utilisable; the Swiss, indeed, have already turned to account, for the cheap production of the electric light in some of their towns, many of their mountain torrents. The experiments of M. Deprez have, it will be seen, opened up a new field of productive force for the future.

To those who may be interested in any way in the approaching Paris exhibition of the *Salon*, the announcement that the works of art are to be submitted for selection a fortnight earlier than usual this year may be of some importance. Pictures and drawings are to be received from the 5th to the 15th of March; sculpture and engravings from the 21st of March to the 10th of April; and architectural drawings from the 2nd to the 15th of April. Our French neighbours are wise in devoting nearly six weeks to the disposal and arrangement of the vast number of works of art which are likely to be submitted to their attention; while they avoid the crowded disorder of the two days accorded by the Royal Academy for the reception of their works of art by allowing more than a month to the artists to send in their pictures, sculptures, and drawings. But the justest of all their arrangements is that of not permitting more than two works to be sent by each artist for admission.

As we have referred to the annual Paris *Salon*, which, we may remind our readers, is entirely managed by the artists themselves, we may further mention that the Government has now finally decided to hold in September next the first of the triennial series of exhibitions which has been the cause of so much discussion in French artistic circles. These exhibitions will remain entirely outside the influence of the artists in general; they will be essentially governmental, and be composed of a selection of the best pictures from each of the preceding three years' exhibitions.

Whatever may be said for and against competition for artistic purposes, and however ill or little artists may agree to work amicably together whenever the design of an architect has to be completed by the aid of the painter and sculptor, in Paris there exists a thorough unanimity of opinion that without the competitive principle, nothing successful in the way of decorative art can be secured. In this respect they have at least the authority of antiquity, and although so many in England are, it may almost be said, disgusted with the frequent failure of competitive contests, it must be admitted that not only have some very successful instances resulted from competition, but that many men who are now eminent and whose names have become historical in the annals of art, first gained recognition by means of a successful competition. A somewhat important exhibition of competitive designs for the decoration of the town-hall of St. Maur les Fossés is at present open in Paris; the designs exhibited represent, in a most marked manner, the contest which is now raging in France between the realistic and ideal schools of conception and execution. But, notwithstanding this lively antagonism which takes so bitter a form, it is impossible to be blind to the effect that modern modes of study have produced, even on those painters who are most virulent in their abuse of the so-called realistic artists. We sincerely hope, however, and believe that in this competition the older school will carry the day. We cannot allow ourselves for a moment to believe that what is called and well understood as the school of impressionists, whatever may be their future, can ever be allowed to exercise their hasty work on the large wall spaces such as the architects afford to the painters, in continuance of the good old traditions of the past.

Alhambra Theatre.—With reference to a statement in one of our contemporaries that "the difficulties with the insurance companies have now been settled," we are asked to say that such is not the case, but that pending the settlement the directors of the Alhambra have made all necessary financial arrangements, and steps are being taken to rebuild at once. The new theatre (which is expected to be opened in October) is to be of fireproof construction, and will contain every modern improvement for the safety and comfort of the public, especial care being taken to provide very capacious and convenient entrances, corridors, and exits. The architects are Messrs. Perry & Reed.

NEW PARIS.*

THE system of co-operation practised so largely on the Continent enables much of what has been done in new Paris to be accomplished with ease, and all share alike in the benefits. If the so-called "strangers' quarter" in Paris is more brushed, swept, and watered than any other neighbourhood, residence within its limits is not debarred to any one, and its beauties are open to all alike to enjoy, a privilege of which the public freely avail themselves. But in every direction the spirit of improvement is manifest; the new houses erected in the most distant and less favourite quarters of Paris differ but little in quality from those erected in the most central; the statues that the municipality purchase so generously at each year's annual exhibitions are scattered about in the pleasant open green squares of the least stranger-frequented parishes, and the trees that form so grateful a shade in the summer, that relieve so successfully the monotony of the street architecture obligatory in a great centre of population, are as freely planted in the outlying districts as in the more central; for if the whole of Paris cannot be as embowered as the delightful and favoured suburbs of Passy and Auteuil (why was not South Kensington built after the same model?) the humblest dweller in the eighth-floor Mansard attic can enjoy in the hottest summer months the pleasure of a seat under the shade of the healthy plane-trees before his door, and the cool ripple of the little rivulet which runs down each side of the well-swept roadway. Paris, indeed, in summer, as Mrs. Browning well said, swims in verdure, and feelingly do the inhabitants express their gratitude for the blessings thus conferred on them by the intelligent co-operation of nature and of art. Never have we heard, as in England, one word against the trees, which science has amply proved, in addition to affording rest to the eye and mind in summer, serve largely to absorb the foul air of the city, and give off purifying oxygen.

In no point has new Paris taken a more vigorous stand than on that of the cleanliness of its thoroughfares, and, sad indeed, in this respect is the condition of the streets of London in comparison with that of those of Paris; and here again our Parisian neighbours show their shrewder knowledge of business, for apart from the increased comfort of existence in dusty summer, sloppy autumn and spring, and snowy winter, it is evident that a large source of wealth is derived from the thrifty use of the refuse and dirt gathered *daily* from every house and square yard of roadway and pavement. That the wear and tear of roads is by this cleanliness reduced is unquestionable. Existence in a civilised city seems occasionally, it must be admitted, to assume the air of a farce in London, when a few days of wet weather have reduced our streets to the condition familiar to every one who knows the metropolis. When it is proved by our French neighbours that, in spite of the busy traffic which, it is alleged, prevents in London the possibility of cleaning the streets, the thoroughfares can be kept in order by their being swept at night by special gangs of *employés*, we must not allow ourselves to listen to those who speak of the difficulties of the question in London. Such indignant letters regarding the condition of our streets as from time to time find their just place in our newspapers would be, and are, unnecessary in Paris. It is singular how many of those little points of detail which so essentially render a great city a metropolis have been considered and carried out in new Paris. Drinking-fountains we, of course, possess in London, though we owe their existence to private generosity; Paris, however, is deficient in the cattle-troughs we owe to the same philanthropic association. We do not yet possess, as Paris and Berlin have both possessed for some time, the excellent institution of *châlets de nécessité* in every large open space. Ample means of communication in our metropolis we should certainly not possess, were it not for the underground railway, while, in comparison with Paris, the organisation of our omnibuses remains a positive disgrace to a wealthy city, and a rich company who do not even seem to have been galvanised into action by the competition of late waged with them by a rival undertaking. The much-vexed question of tramways appears to be giving the Parisians none of the trouble noticeable in

---

* See p. 270, *ante*.

London, they having, very wisely, altogether discarded the thought of introducing the tram into the highly-frequented thoroughfares, making their termini at such spots as can in no way interfere with the old-established habits of street locomotion. Existence, in fact, in Paris is yearly being robbed of much of that amount of friction which we in England seem merely content to endure, and, in accordance with true British habits, to grumble at.

With so many means of enjoyment as are afforded in Paris to the student, the worker, and the idler alike, well may Paris be willing to be called a city of pleasure. Nowhere can the lounger, the *flâneur*, more easily indulge in his somewhat reprehensible habits, for from morning to night the daily life about him affords him the cheapest means of distraction. On week-days he has always enough to do: in summer military music plays for him in half a dozen of the squares of the capital, and if he is unable to hear the Sunday classical concerts which, for so many years, have been regularly given in the Cirque-d'hîver, the Châtelet, and the Château d'Eau theatres, he can twice a week enjoy the equally refined music of the Garde Républicaine band under the tall trees of the Tuileries gardens, or in the crowded Palais Royal. The museums are open to him to study either the wonders of the industry of the past, or the attitude of the French workman of the present; the rooms of the Hôtel Drouot place gratuitously on view for him the more important sales that are to take place during the forthcoming week; at Saint Cloud and Versailles the fountains play for him; in the summer months the annual *Salon* is open free on the Sundays; the Champs Élysées, the Tuileries, and Luxembourg Gardens are alive with life, and all he has to do is to enjoy himself,—gratis.

Of the numerous other enjoyments, of the theatre, of the music, and of public entertainments generally there is no need to speak, they are even greater features in new Paris than they were in the Paris of the past; the avidity with which all classes appear to crowd the places of amusement in new Paris, as they do in London, and indeed the world over in the present day, certainly indicates either a rapidly-increasing love of enjoyment, or, what is more likely, a growing ability to satisfy its desires.

The shop-windows take, in new Paris, a very conspicuous place; there are very few thoroughfares, if any, in Paris, in which shops are not to be found; it is, indeed, very common for the ground-floor of the *maison de rapport*, or house built to let out in flats, to be utilised for shops, and as in Italy next door to the grandest *palazzo*, a shop will be found in Paris next door to the most stately *hôtel*. Shop-windows, therefore, form in new Paris a very conspicuous feature, and though Paris has long been famous for the skill with which its shop-windows are arranged, the art of the *étalagiste* is carried in new Paris to an even greater pitch of perfection than ever. It is to be regretted that, in certain parts of the city,—those, let it be remarked, to the disgrace of the passing visitors to Paris, chiefly frequented by strangers,—many of the shop-windows still exhibit in shameless publicity works of would-be artistic character, so immodest in their intention and worthless in every way that one wonders not only how tradesmen can be found willing to increase their capital by means so questionable, but that purchasers should be found in a sufficiently large number to keep the trade alive. But if, in respect to what we have referred to, there is very much to condemn, it cannot be denied that new Paris merits in most of its shop-windows the highest praise; such shop-windows are, indeed, not to be found in any other city of Europe.

To the practical builder even, perhaps, more than to the architect, new Paris offers a larger field of inquiry and study: all the great cities of Europe, excepting London, appear perfectly satisfied to make their own modern alterations as much in the spirit of Parisian architecture as can be conveniently adapted to the character of their own cities. Whether, however, the English builder and architect are disposed to recognise the merit of the work done, is a question which they best know; we ourselves cannot but think that new Paris offers many points that we in London and in our other great cities might very successfully study and adapt.

It would be impossible for the professional visitor to Paris, after a pleasant ramble through the metropolis, and more particularly those portions that constitute new Paris, not to admit that we in London have yet something to learn in the matter of urban architecture. A visit to the grandiose neighbourhood of the Parc Monceaux, scarcely yet freed from its scaffold-poles, and the neighbouring *quartier* of the Avenue de Villiers, where the successful painters have erected so many of their picturesque dwellings; a tour through the still progressing area that stretches between the Champs Elysées and the Trocadéro, there as representative of the homes of the wealthier portion of the community; or a visit to any of the outlying districts or the more recently built streets and avenues in the centre of the city, the neighbourhood of the new Hôtel des Postes, the Boulevard St. Germain, the Boulevard Henri Quatre, the Boulevard Haussmann, the Boulevard Malesherbes, or the Avenue de Messine,—a visit to any or all of these representative portions of the French capital will give a stranger a very fair idea of the exterior character of the new metropolis; but it requires the leisure and repose of long acquaintance to fully understand the French capital, and then one discovers how delightfully are mingled in the midst of the whirl of modern life, the traditions of the past and the existence of old Paris, with the many comforts and conveniences afforded to the dweller in new Paris.

THE SANITARY CONDITION OF HOUSES IN THE COUNTRY.

THERE is probably no truer proverb than the French saying, that it is the first step which is the important one, if we may so paraphrase it; and the fact that public interest in the metropolis, and somewhat to a lesser degree in the large provincial towns, is now aroused upon the subject of sanitary improvements in domestic matters is some guarantee that the hardest days of sanitary reformers are over in the towns. Not that it is time yet to relax any efforts, for there are masses of persons still crassly ignorant and utterly careless of the elements of sanitary science. There can, on the other hand, be little doubt that in provincial towns and in the country districts there is still a great absence of knowledge as to this question. Not only does it exist among owners of large mansions, who, one would expect, would be the first to make sanitary improvements; but it is still more noticeable among the proprietors of small country and provincial town houses, among clergymen, farmers, and other dwellers in rural districts. One reason of this continued neglect of sanitary precautions is the fact that there is so strong a belief in the healthiness of the country, a belief which, however true it may be in itself, becomes nothing more or less than a pitfall, if relied upon as a counteracting agent against the injurious effect of an absence of the elements of proper sanitation. This kind of belief in the value of country air and habitation, as opposed to bad drainage and so forth, may even be found among dwellers in towns, who will relax precautions as soon as they get into the country. There are also other and obvious reasons, just as there are for the fact that in country districts medical science is, in many instances, distinctly behind that of the metropolis and great provincial towns. But the difficulty of impressing country builders and plumbers with the necessity for taking various actual sanitary precautions is quite different from the difficulty of introducing medical improvements. The plumber dislikes and abhors, and has a contempt for the new-fangled ideas; the medical man is only too glad to carry them out if he only had the time and the opportunity for becoming thoroughly acquainted with them. Thus by the combination of various causes there is no doubt that an advance in the knowledge of sanitary principles in the country has not taken place to the same extent as in the great towns.

Yet, as a whole, the improvements which are gradually becoming more common in towns are just the same as are needed in the country. There are only two points upon which there is any considerable difference, one being in respect of the water supply, the other in connexion with the disposal of sewage. In the towns it is simply, as a rule, a question of the best place in which to store water, and the best materials in which to carry it and keep it. But in the country there are not only these points to be considered, but there is the very important one of keeping the water free from contamination either in its inception or in its course to the house. No one with any experience of country houses can doubt that many illnesses are caused by the water being contaminated in a well or during its course from the well. In many houses of a good character in the country, the well which supplies the drinking-water and the cesspool which receives the sewage of the house will be found in such close proximity that the cesspool will at one time or another probably contaminate the well-water. This is a danger which in the towns has less to be considered, but it is one of most vital consequence to any person who owns or lives in a country house. Just as spring is coming upon us, and persons are beginning to think of their country quarters, they should not fail to consider whether or not the water which they use is pure and wholesome. The cause of teetotalism, too, would be greatly benefited if persons interested in it would not only preach the doctrine that water is the best of all drinks, but would do something practical to secure us from being poisoned if we drink it. Again, in regard to the second point, there is no doubt that there are numberless houses with cesspools dangerously close to the dwelling, and that these and foul outside closets are also a cause of much sickness. It is too often supposed that, because one member of a household has alone perished from typhoid fever or diphtheria, therefore the cause of the only individual's illness is not bad sanitary arrangements; but it should always be borne in mind that where one constitution will readily absorb the seeds of disease, other constitutions will prove that they do not suffer, and that in one condition of health a man will pass unscathed through a sanitary ordeal, whilst if he be in another he will quickly succumb. So that the only security which a prudent houseowner can take is to set his house in order, so that the inmates, whether they be robust or weak, will have no health ordeals to pass through.

But there is a distinct practical point in connexion with this subject which needs to be mentioned, and that is, the best means to increase a knowledge of sanitary principles among all classes of dwellers in the country. It seems to us that it is of the first importance that simple and popular lectures treating of the main principles of sanitary science in connexion with houses, and showing how those principles can be carried into practice, should be given in the various provincial towns. Cookery lessons, and lessons to teach ladies how to bind up wounds and make bandages, are now common in country towns, and lectures both to gentlefolk and tradespeople should be given in every town in England. Then there are the medical men, who should point out to their patients how to keep in health, as well as to cure them when they are ill. They will always in this world have plenty of patients, and medical men should take every opportunity of pointing out the main sanitary principles when they get an opportunity. Then there are the clergy, who can be reached in various ways. For example, what could be more wholesome reading for the clergy of England in the *Guardian*, the *Rock*, the *Church Times*, and such-like publications, than a course of papers on domestic sanitation. The subject is one which must be treated and brought forward so as to catch the attention of all classes, not merely of a few isolated individuals, who sensibly turn their attention to the subject. The improvement of the sanitary arrangement of our country houses, great or small, is clearly a matter of pressing importance, and as yet almost untouched.

The Ashpitel Family.—Last week was laid to rest in the old family vault, Anne, eldest daughter of the late William H. Ashpitel, J.P. Her family was one of the oldest and most respected in Hackney. More than one hundred years ago, when her ancestors were living there, Clapton was a delightful country village, with fine old houses surrounded by orchards and pleasure-grounds. At that time it was deemed necessary for travellers to meet together to go from Shoreditch to Hackney for fear of highwaymen who infested the highways. Of the well-known old family of the Ashpitels there are, we believe, but three survivors,—one son, a clergyman in Bedfordshire, one unmarried daughter, and another married to the Rev. W Denton, vicar of St. Bartholomew's, Cripplegate

THE MOSQUES OF CORDOVA AND KAIRWÂN.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AT the ordinary meeting of this Institute, held on Monday evening last, Mr. David Brandon, vice-president, in the chair.

Mr. R. Herbert Carpenter read an interesting paper, entitled "A Comparison between the Mosque-Cathedral of Cordova and some other Contemporary Arabic Buildings." Mr. Carpenter said he proposed in his paper (which was illustrated by numerous plans, sketches, and photographs, to which constant reference was made) to lay before the Institute some information as to the great Mosque-Cathedral of Cordova, and also some remarks upon Seville Cathedral, both buildings having been left undescribed by Mr. Street in his admirable work on Spain. The communication was the result of a recent visit by Mr. Carpenter to the south of Spain and a part of the north coast of Africa. The author complained of the unreliability of the guide-books, even good ones, such as O'Shea's and Murray's, on the subjects in which he had interested himself, conveying as they did altogether dubious impressions. He would, therefore, refer to the mosques at Mecca, Jerusalem, Damascus, and Cairo, with which these authorities compared that at Cordova, and then to the more primitive type, from which, in his own opinion, its plan was really derived, namely, that of Kairwân, in the newly-annexed French province of Tunis. He accordingly began with that of Mecca, graphically recapitulating the current Moslem traditions relative to that mother mosque of the Mahommedan world. Passing thence to Damascus, history taught us that it was the first great city conquered by the Arab invaders, into whose hands it fell about A.D. 634, followed by Jerusalem a very few years later, and by the North African conquests in A.D. 711. The mosque at Damascus was a curious combination of Romano-Christian and Arabic work, and it had never yet been described in such detail as it merited, partly through the peculiar intolerance of its inhabitants. Mr. Hayter Lewis, however, had carefully examined and noted some of its features, and these were briefly alluded to. Originally a great Roman temple stood on the site. In what way this was converted into the Basilica of St. John the Baptist had not yet been clearly made out; but the massive substructure of the western minaret went back to that date, possibly the beginning of the fifth century, or even earlier, and this portion of the mosque might have formed the campanile of the church. At first, after the Arab conquest, the Christian building was divided between Christians and Moslems; but eventually the Caliph Walid required the whole, and rebuilt it, using the older columns and capitals and other materials of both ancient buildings. The new erection was then described. The El Aksah Mosque at Jerusalem was next spoken of; this stood on the site of the church built by Justinian in honour of the Virgin, as the author thought, although he candidly owned that Mr. Fergusson places Justinian's church on another site. A description of it was given, illustrated by a plan enlarged (by permission of the Council of the Palestine Exploration Fund) from the survey of Major Warren. The author now came to the great mosque at Kairwân, which up to the late annexation of Tunis by France was quite as sacred from profanation by the infidels as Mecca itself still is; so much so, indeed, that when Mr. Rae visited it he was quite unable to do more than glance through the doorways into its interior, and when taking some few notes of the exterior was glad to place himself under the protection of a guard of soldiers granted by the Kaid. Notwithstanding all these difficulties, he got at the main features of the mosque with wonderful correctness, as was proved by Mr. Broadley's "Tunis, Past and Present," whose plan, through the kindness of that gentleman's father, Canon Broadley, Mr. Carpenter was allowed to reproduce on the same scale as was adopted in his own plans of the Cordova mosque, and of those of El Aksah and Damascus. The growth of the Kairwân mosque was then described, from its small beginnings, when it was founded by the Emir Okhbah in A.D. 667. Successive rebuildings or enlargements took place in 691, 727, 777, and 827 A.D. The number of columns inside and outside the building had been variously given by various writers. An old Arab record of the eleventh century gave the number as being 500. According to the French plan there were 501. Mr. Broadley stated the number to be 439, while Mr. Rae gave the number as being 435. These columns are of marble, porphyry, granite, and other stones of infinite variety and beauty. The author's account of this prototype prefaced his description of the grand Mosque-Cathedral of Cordova, famous both for its very considerable architectural and artistic merits, and also as being the only survival in Europe of the primitive style of the Moslem places of worship. As already mentioned, the great Moorish invasion of Spain took place in A.D. 711, supplanting the old Gothic kingdom, after its having lasted two centuries and a half. In that year Tarik, the Moorish conqueror, captured Cordova, and converted into a mosque a large part of the church of San Vicente, which stood upon the site of a former temple of Janus, leaving the rest, with their usual generosity, to the Christians, who however, were afterwards brought out at a cost of 44,000*l.*, by the Caliph Abd-el-Rahman in A.D. 786. The architectural details of this building formed the staple of the paper.* Having gone through them, Mr. Carpenter said that, on comparing with each other the different buildings passed in review, it was clear that the Mosque at Mecca formed no guide for any of the rest, either in form or style. The conditions under which it was built were quite peculiar. It was the centre of worship for the Moslem world. The Kaaba and its surroundings marked the place for the faithful, who were at first simply walled in, and were afterwards shut in by covered cloisters, the dimensions of which were again and again enlarged. But at all other cities of the Moslems the Kibleh, or direction of the Kaaba, was the all-important condition to be observed in building a new mosque or in altering an old one. The Kibleh once fixed, what was left was the provision of proper shelter from the sun for the worshippers. When the Arabs established themselves on a new site, the simplest plan they could follow, after fixing the Kibleh, was to build sheds or aisles side by side, surrounded by walls, adding an open walled court for purposes of ablution. At other places some existing building could be made available. But since a church or basilica ran east and west, whilst the Kibleh of a mosque required, when it was north of Mecca, to be south, and in the southern parts of Europe must necessarily be east or south-east, it was only in some places that the basilicas could be altered or adapted to Moslem wants. In other places the basilicas had to be swept away, since the difference in angle between east and south-east made it impossible to make use of them. An exception was made at Constantinople, where the glorious Church of St. Sophia was spared, and the now existing compromise arranged. At Jerusalem and Damascus the south aisle wall of the respective basilicas very conveniently became the Kibleh wall of the mosque, with more or less adaptation of the building in other respects. At Kairwân there was no already existing building to adapt, and Okhbah fixed the Kibleh, it was said, by supernatural help, and built his aisles side by side. The men of Kairwân, having become the conquerors of Spain, found a church already existing at Cordova, but they had to clear it away, as its south wall did not tally with their south-east Kibleh. They accordingly followed their own indigenous type, and kept to it throughout all their rebuilding. And when people, originally from the same Kairwân, under their General Gouher took Fostât, or Old Cairo, in A.D. 973, and founded El Kahirah, the Cairo of the present day, the Mosque of Azhar was founded and completed by that soldier in A.D. 981, on the same general type of the great Mosque of Kairwân. In after centuries it was rebuilt, but the proportion of its original plan was preserved. Thus the Arab historian Makrizi, who wrote in the latter half of the fourteenth century, related that a great earthquake happened in A.D. 1303, which laid the whole in ruins, so that it had to be entirely rebuilt. Of other Cairene mosques, the older one, at Touloun, founded A.D. 679, was more like that of Damascus, and its aisles ran across it, instead of in the Kibleh direction. The Mosque of Hakem resembled that of the Touloun; but the Mosque of Amrou, when rebuilt (as it is now), followed the Kairwân type. Hence the author thought the Mosque of Kairwân most valuable historically, as being the model of buildings in countries so widely apart as Egypt and Spain. The remainder of the paper was devoted to an account of Seville Cathedral, and its relation to the Moorish epoch of Spanish history.

In the discussion which ensued,

Mr. Percival said he had lately visited the mosque at Kairwân, Mr. Broadley being, in all probability, the only other Englishman who had been there before him. Up to the time of the recent French occupation of Kairwân, the city had been entirely isolated from the Christian world for more than 1,100 years. The Jewish traders who came from Susa had to stop two miles outside the city. The few Christians who were allowed to walk through the city by the permission of the Bey, including Lord and Lady Bective, had to be provided with a military escort. Even Mr. Rae had not been able to see the interior of the mosque. As regarded the interest attaching to the mosque from its great antiquity, there could be no doubt whatever that Mr. Carpenter had proved his case. The mosque at Kairwân was undoubtedly the typical mosque, and was certainly one of the oldest mosques in the world. There seemed to be little reason to doubt that, as Mr. Carpenter argued, the Mosque of Cordova was based upon the same design as that of Kairwân. Another point of special interest attaching to the Mosque of Kairwân was that it was a building which had been erected primarily and entirely for use as a mosque; it had not been converted to use from a basilica or any other building, as was the case with Sta. Sophia at Constantinople. He was once at a grand service in the Mosque of Sta. Sophia during the festival of the Ramazan. The interior was brilliantly illuminated with lamps, and the whole of the roof was lighted up with glorious effect. But the whole effect was spoiled if the spectator looked down on to the floor, for the whole of the worshippers stood in lines across the whole of the building, about 3 yards apart; but these lines of worshippers were crooked, or askew with the lines of the building, for they looked towards Mecca. Of the beauty of material in the columns of the mosque at Kairwân it was impossible to speak too highly. Every kind of marble, porphyry, granite, and all kinds of coloured stones, were used with beautiful and varied effect. On entering the mosque the effect at first was disappointing, for going in out of a brilliant sunshine the whole effect appeared to be poor and dull. Making friends with the custodian of the mosque, however, all the doors were opened one by one, and through the doorways a flood of sunshine came in upon the coloured columns, and the effect was magnificent. The visitor very naturally inquired where all these wonderful columns came from. Some were, no doubt, brought from foreign parts, although the country was itself rich in coloured stones. Tunis contained many interesting remains, including a Roman amphitheatre,—the third largest in the world, he believed. There was enough to see, besides the Mosque of Kairwân, to tempt any one visiting Algeria to extend his travels to Tunis.

Mr. Wyatt Papworth moved a vote of thanks to Mr. Carpenter for his interesting paper, and expressed the hope that the Council of the Institute would be able to publish in their "Transactions" all the plans which had been exhibited. Personally he had taken very much interest in the Mosque of Cordova for a great many years, and he thought it was very well known who were the architects of it.

Mr. R. Phené Spiers, in seconding the motion, said he had not seen either the Mosque of Cordova or that at Kairwân, but from the plans exhibited of them he should say that Mr. Carpenter was correct in the conclusions he had drawn, particularly with regard to the Mosque of Kairwân serving as a type for the Mosque of Cordova. Possibly it also served as the type of the mosque of old Cairo, which was supposed to have been founded in the seventh century, although it was doubtful whether any portion of it remained. Of course it was older than the

* We may mention that a plan of the Mosque of Cordova was published in vol. xxxvii. (1879) of the *Builder*, p. 808. This plan was accompanied by a letter from Mr. Carpenter (p. 807), a previous letter from the same gentleman appearing on p. 582. These letters, together with an article on p. 505, and a letter from Mr. Wyatt Papworth on p. 882 of the same volume, may be usefully referred to in connexion with this abstract of Mr. Carpenter's paper.

Mosque of El Azhar at Cairo, for old Cairo was abandoned on the building of New Cairo.

The Chairman, in putting the motion, said it had not been his good fortune to see any of the mosques mentioned, and therefore he could not, without further consideration, venture to say anything upon the subject. But of one thing he was quite sure, namely, that the meeting would concur with him in thanking Mr. Carpenter for the trouble and pains he had been at in preparing and reading his paper, which was one of very great interest. It was, however, a paper which required to be read and considered carefully and quietly before discussing it. He cordially coincided with the suggestion that the plans with which the paper had been illustrated, or at any rate some of them, should be published in the "Transactions," with one or two views, if possible.

The motion having been carried unanimously, Mr. Carpenter said a few words in acknowledgment, and the meeting terminated.

NOTES ON PROFESSIONAL PRACTICE.

ARCHITECTURAL ASSOCIATION.

At the ordinary fortnightly meeting of this Association, on the 16th inst., Mr. E. G. Hayes, President, in the chair, the following gentlemen were elected members, viz., Messrs. W. L. Buxton, A. H. Osmond, J. Upton, A. H. Heren, A. Miles, C. W. Piper, F. S. Ogilvie, E. Greenup, H. D. Walton, J. Lord, jun., H. Evans, A. E. Mullins, and F. Swinburne.

Messrs. E. J. Tarver, past-President, and Mr. W. H. Crossland, F.R.I.B.A., were elected members by acclamation.

On the motion of Mr. W. H. Atkin Berry, a vote of thanks was accorded to Mr. Gribble for conducting the members over the new Church of the Oratory at Brompton, as mentioned in our last.

Mr. Arthur J. Gale then read a paper entitled "Some Notes on Professional Practice." Disclaiming any intention to go very deeply into any of the details of the various departments of modern architectural practice, the author proceeded to pass in review some of the circumstances which lead up to and influence that practice, and some of the relations in which the architect stands to his work and his employer. Looking back to the beginning, considering the development and education of the average English practitioner, one of the first questions to arise was, "Of what sort are the young men who join the profession in such numbers, and what education have they received before doing so? In fact, what is the nature of the raw material which is eventually to become the qualified practitioner?" The honourable status which, notwithstanding many failings, the profession undoubtedly held; the more or less lucrative nature of the rewards which awaited success in almost every branch; and, to the devoted student, the undoubted pleasantness of the work in most of its phases, drew to the profession men of all grades in life, and almost all degrees of education. To take, however, an average example, a boy came to the profession fresh from school, with a fair acquaintance, perhaps, with Greek and Latin, one or two modern languages, English (in the comprehensive sense of the term), and a well-grounded acquaintance with mathematics,—the latter of such a nature as to carry him successfully through constructive formulæ and calculations. In addition to these acquirements, it was now becoming increasingly desirable that the young architect should possess an elementary knowledge of physical science in some of its branches. These subjects, in addition to drawing, formed a fair ground-work on which to build the future reputation of the young architect. No doubt a University degree was exceedingly beneficial, as maturing the higher studies (which at school were merely begun), and as giving a tone to one's career which was hardly definable; but it was open to the great objection that its attainment prevented the acquirement, during the most receptive years of one's life, of a vast amount of most valuable detail which could only be learned in the up and down trials of active professional work. But, without going to a University, the young architect might pursue the higher studies referred to, such as physical science, concurrently with the acquirement of all that he could learn from office practice, from sketching, class study, lectures, &c. The opportunities now offered to, and so widely made use of by, students at University and King's Colleges and in the Association, were such that the diligent student, coupling them with the experiences of his pupilage, should have no difficulty in accumulating a large store of useful professional knowledge. Without going into the question of how many practical branches of the profession a man might thoroughly take up without detracting from or destroying his artistic merit, the author held that no man could lay claim to or should hope to hold the highest positions as a practising architect unless he was a thoroughly practical man as well as a true artist. Much damage had been done to the standing of the profession in the eyes of a critical public by the fact that, in matters constructive, many architects relied almost entirely upon the practical knowledge of the quantity surveyor, to whose special department such matters were assumed to belong. One great aid to professional excellence was foreign travel. This was a point fully appreciated by the Americans, and it was noticeable that, as a general rule, those who had attained the most genuine success, both in the amount and quality of their work over there, had studied in the schools of Paris and elsewhere, and had travelled in Italy and other parts of Europe. But supposing that the majority or all of these advantages had been enjoyed, and that the future professional man had completed his articles, and had served a year or two as a junior in a good office, and assuming that practice on his own account was for a time out of the question (the public being slow to trust their commissions to young men), he perhaps obtained an appointment as managing assistant to a man in good general practice. Here the thoroughness with which he had pursued his studies in the past would serve him in good stead, and such a position afforded a practical training of the very best kind. Passing on to notice in detail some of the many phases of modern practice which confronted the man who, having work offered him, and who (having passed the new examination) had joined the ranks of the Institute, and was fairly in a position to start for himself, the author observed that possibly such a one would not have sufficient work to keep him profitably employed for the whole of his time; in such case it was a very usual proceeding (and one which both principal and assistant often found convenient) to arrange for half one's time at one's own work, and half at the principal's office. With regard to competitions, although by their means well-deserved and brilliant successes had been gained, yet, even where there was no jobbery at all, the best design, and that most suited in all respects to the circumstances, did not, in a great many cases, win the day. As the result of a long series of discussions at the Royal Institute of British Architects, a new set of rules for the conduct of architectural competitions had recently been promulgated, in place of those issued in 1872, and things were much better than they were some time ago. In dealing with his first building of any magnitude, the architect would meet with many difficulties. The commission obtained, he would perhaps have to advise upon a choice of site, as to which many points would require consideration. Here (as should always be the case in providing for the wants of a client) careful inquiry should be made as to the present and probable future ways of the household, for on that knowledge would depend the success of the plan. In the *Times'* leading article which commented in favourable terms on the late Mr. Street's presidential address at the Institute, architects as a body were accused of building houses for their clients as if they were all physically, intellectually, and in every way alike. Supposing the preliminary sketches to be approved, the next point was the preparation of the working drawings, and as to these it was in all respects false economy to stint expense, for a good set of drawings, at all points carefully worked out, and a specification full and clear, were better safeguards against "extras" than any amount of provisional sums. Before taking out quantities it was desirable that anything the end and solution of which could not be seen to a small scale, should be settled by larger details, and the specification should be written. It was to be regretted that the specification should be so often left entirely to the quantity-surveyor, for the architect himself must know best what he meant the work to appear and to be in each particular case. It was no answer to this to say that the quantity-surveyor was the more practical man of the two. Why should he be? As far as the author's experience went, he had not found any reason to believe it to be improper or inadvisable that the quantities for his own works should be taken out by the architect or under his eye in his own office. That course ensured careful and reiterated attention to the details. The quantities must, however, if taken out by the architect, certainly be paid for direct by the client. Care should be exercised in selecting builders. The contract form of the Royal Institute of British Architects was generally accepted, but if that form were not used, great care should be exercised in the preparation of the document. The regulation form of words was the best, as their power had been tested and found reliable. The selection of a clerk of works was a difficult point, for he might prove to be unreliable in many ways. He might drink, or connive at builders' dishonesty, or if honest and sober he might be incompetent to perform his duties. An energetic architect's assistant (junior, pupil even, or otherwise) might make a very good clerk of works, especially if gifted with tact and business capacity. The clerk of works should be constantly on the works, and not be kept too much in his office making drawings, nor sent away on errands, if it could be helped. He had quite sufficient to do if he properly attended to his duties, without having the care of matters which were better done in the architect's office. A mistake or "scamping" should be checked as soon as detected, and not allowed to cost the builder unnecessary labour after discovery. An honest builder should be treated with all the consideration that could be shown to him. The architect's appearances in public were few or many, according to the nature of his practice. If he were largely concerned as a witness in legal cases, or as architect to public bodies, his opportunities of proving his aptitude for speaking and thinking quickly and well would be numerous. An appearance in the witness-box, even for a man with a clear case to prove for his clients, and with a habit of saying in a few clear words what he wished to convey, was not a thing to be lightly undertaken. It required a clear head and an entire absence of nervousness and flurry. There were few more pitiable spectacles than a nervous professional witness being "turned inside out" by clever counsel, and they mostly *were* clever counsel who were retained in cases where professional witnesses were called. The professional witness should arrange the evidence he intended to give, and his reasons for giving it, clearly and concisely in his mind, ready to answer on his examination and cross-examination. He should have on paper ready for reference figures and data on all the points of the case, so that he might be prepared to answer any question that was likely to be asked. It should be remembered, however, that there was a limit to the use of written data in the witness-box, and that too frequent reference to them was checked by interference from the opposing counsel, and frequently from the presiding judge, presumably with a view to prevent an untrustworthy witness from showing a good case for his own side by means of a carefully-framed fictitious story. *Sanitation* was a question which, after passing through a long period of neglect, was now coming to the front rank of subjects upon which the architect was expected, not only to know something, but all that it was possible to know. As Mr. Cole-Adams had pointed out in his paper entitled "Barnacles," read last session,* the custom of ignoring the subject as beneath notice could not be too strongly deprecated. In reality, ignorance of the subject was an impediment to success. If sanitary details were left to the builder or clerk of works, they were often again delegated to that enterprising purveyor of bad smells known as the English labourer. The consequences of ignorance or neglect in such matters were often likely to be fatal. In considering the arrangements necessary for the drainage of a house, it was, of course, necessary to ascertain the requirements of local authorities entrusted with the supervision of such work, otherwise they would step in and upset all calculations by their restrictions, many of which were just, although others were exceedingly unjust and foolish, while there was often a great want of unanimity in the regulations of different districts. The voracity of the appetite of local authorities, or their surveyors,

* See *Builder*, vol. xli., pp. 750, 800.

in the matter of drawings, was often considerable, extending, as it sometimes did, to the depositing of plans not only of the drainage, but of the buildings entire, including detail drawings and specification! Too great caution and care in the execution of drainage work could not be manifested; if there was any chance offered of mistaking the meaning of the drawings, mistakes would be made. Drains should be finally tested by stopping the lower end and filling with water; and during construction care should be taken to ascertain the correctness of the falls, and the jointing and subsequent clearing of the pipes. The difficulty of deciding upon the respective merits of the various specialities and patented appliances was considerable; one good thing was not suitable for all cases, and the only secret of success seemed to be to become master of the principles, and then to apply them to the peculiar circumstances of particular cases. It was likely that somewhat more would be expected of architects in the future than in the past in the matter of warming appliances. The Smoke Abatement Exhibition must have done good, and if there were not many new things there, and if some of those even were of questionable general utility, there was much of an interesting nature to be gathered from a visit. The present position of affairs with regard to domestic warming seemed to be that the English home demanded an open and visible fire, and had it, but, with it, the disadvantage of utilising only a portion of the latent heat, a great deal of which went up the chimney. Various expedients in the way of reburning the gases, slow combustion, revolving fuel-holders, &c., had been put forward at the South Kensington show, but few, if any of them, seemed to really overcome the difficulty, while some were costly to obtain and complicated to use (the last a fatal objection). We seemed to be on the edge of a step still to be taken, viz., the provision of a fairly-cheap and easily-worked grate which should give the maximum of heat obtainable, and be conveniently regulated, no matter whether it were a coal fire, a gas fire, a fire of anthracite coal, or a combination of gas and coke, so long as it was an open fire. The great question of *ventilation*, in its relation to warming both public and private buildings, was too large to be entered upon in such a paper as the present; but it might be said that while ventilation with a warming apparatus for public buildings was comparatively easy, though by no means always done well, it was quite certain that domestic ventilation had long been at a standstill, and was very capable of improvement. Should not architects lead the way in the matter? An acquaintance with the sources and quality of *water supply*, the difficulties likely to arise in special cases, means of contamination, storage, &c., was too well known to be essential to render it necessary for the author to dilate upon it. *Damp* in buildings was frequently more troublesome and difficult to remedy than many other annoyances. Mr. Ewan Christian's remarks* at a meeting of the Association last year dealt somewhat fully with the matter. Estimation beforehand of the depth at different seasons (and the amount) of the ground-water below the surface was a point requiring careful attention. Inattention to it, and to the kindred one of soil and site, might result only in discomfort to the occupants; but, on the other hand, failure of the foundation, and, by consequence, failure of the whole building, might ensue. *Dilapidations* claimed frequent attention from the professional man. In most cases the repairs due or desirable year by year had, except those specially and by name provided in the lease, been left till the end of the term, and their evil consequences had become the more disastrous. What was, and what was not, fair wear and tear; identification of the original state of the premises; the best way to cope with a failure in construction, so as to do justice both to lessor and lessee,—all these difficulties would arise for settlement, and the work required would have to be priced out in detail, and a total amount settled as a fair claim. Nothing was so helpful to the architect in work of this kind as sound knowledge acquired by previous thoroughness in study and practical knowledge of the carrying-out of buildings. Having briefly referred to questions affecting the management of building estates, Mr. Gale observed that it behoved an architect, when acting for a public body or company, carefully to see that his instructions to act, were in due form and entered on the minutes of the Board meeting at which the appointment was made. Incorporated bodies could contract under seal only. The question of the ownership of drawings had never been settled in a final and satisfactory way. The fairest view of the matter seemed to be that the drawings were merely the vehicle by which the architect provided the client with the building he wanted. The majority of the drawings could be of no real use to the client; legally, however, they must be given up if asked for. With regard to professional charges, the schedule of the Royal Institute of British Architects is generally accepted, and might be followed fairly enough. A good method, if one's charges could hardly be assessed on the Institute schedule, was to keep account of the time occupied on a client's work, and to total-up and price the same at some fair remuneration per hour or per day, according to circumstances or custom. Specialism, or the development of a host of specialists, had been much talked of lately, and there was much advantage to be gained by the profession at large from the special attention of different men to different subjects. It had, however, its dangers. Architects could not, any of them, neglect general knowledge for the study of a speciality, as that would prove a fatal error. It would, however, be of advantage that the profession should be self-contained, and not be invaded by a number of outside men who, in various subjects now-a-days, were reaping the benefits of carelessness and want of knowledge on the part of architects. *Valuations* might be taken as an example of the subjects of which it was necessary for all architects to have at least a general knowledge. With regard to the relations of the architect to the solicitor, the latter had many chances of placing work in the hands of the former, and the young practitioner with several friendly solicitors to give him work need not fear starvation if he were worth his salt. In light and air cases the surveyor was expected to bring to bear a special knowledge of the requirements of various buildings as to light, and an understanding of the principles and practice of the law of easements. It was somewhat unusual for any but men of large experience in this particular direction to be engaged upon light and air cases, since a long and distinguished professional record assisted more than anything else to gain for a witness such a hearing as would tell favourably for his client's case. Still, the younger members of the profession must be fully acquainted with the theory upon which both the physical and legal aspects of the case were founded. The subject was now engaging the attention of the Council of the Royal Institute of British Architects. In conclusion, the author referred to the conduct of arbitrations.

In the discussion which followed,

The Chairman said Mr. Gale had read a very comprehensive paper, touching as it did upon almost all the important matters with which architects had to deal in professional work. Of course some of the qualifications of a thoroughly practical architect were only to be acquired by actual experience and practice. Perhaps, however, Mr. Gale's suggestion as to the employment of pupils as clerks of works was a little premature. A pupil who was out of his time might, no doubt, in many cases, efficiently perform the duties of a clerk of the works. The position held by a clerk of the works was a very responsible one, calling for a good knowledge of building materials and an accurate knowledge of the ways of putting them together. He was glad to see Professor Kerr present as a visitor. Perhaps he would favour the meeting with a few remarks.

Professor Kerr said he always felt very much pleasure in attending the meetings of the Association, and to contribute what little he could to the instruction of the evening. He had listened to Mr. Gale's paper with very great satisfaction indeed; the range of subjects which it had touched upon was very large, and although it was impossible within the limits of a paper to treat all or any of them with minuteness, yet Mr. Gale had successfully called attention to a number of matters which required anxious thought and consideration on the part of those just entering upon the work of the profession. The point to which the Chairman had referred, viz., the employment of architects' pupils as clerks of works, was a very important one, and one well worthy of further consideration. In these days, when the architectural profession was extending itself in respect to numbers so very largely, and when the amount of work to be done was not extending itself in precisely the same proportion, he held it to be the duty of all those who wished well to the profession to promote the cultivation by all possible means of all kinds of architectural knowledge and employment. He was happy to see that in many ways architects were pushing themselves into fields of exercise which formerly were closed against them. With regard to the particular field of operation which was connected with the duties of a clerk of works, the case seemed to be this:—Nothing could be more valuable, educationally, to the young architect than the exercise of the duties of a clerk of works. At the same time, however, he must be competent to exercise those duties. What a clerk of works had to do on average works was to interpret the architect's drawings for the builder or the builder's foreman; this work the builder and his foreman were not, as a rule, quite so able to do as might be supposed. The clerk of works had also to watch over the client's interest in regard to several matters, such as the quality of the materials, the nature of the workmanship, and, generally, the performance of the work judiciously and well with the avoidance of "extras." Now, of course, the young architect was not able to take all that responsible work on his hands at once. But the young man who had passed through his apprenticeship, and who desired to pass a year or so on practical works, could not do better than to go as a clerk of works. Architects were not, as a rule, sufficiently alive to the necessity of sending out their pupils to inspect works in progress. Such neglect was not intentional or selfish. Now, a young man who adopts architecture as a business, to put it plainly, ought to be sent out to see how building work was executed; he ought to be permitted to pick up what knowledge he could out of the office as well as in the office. It was quite true that sometimes young men in architects' offices, when they had an opportunity afforded them of seeing works in progress, did not use it. The pleasant work of drawing in the office was often preferred. There was one other question touched upon in the paper, as to which he should like to say a few words, viz., the relations of architects with lawyers. Now, it unfortunately happened that in this country at the present moment the lawyers were increasing in numbers to a most alarming extent; and inasmuch as lawyers would live, whoever starved, it followed that disputes were increasing in number and in inveterate bitterness. No misunderstanding, it appeared to him, could possibly arise now but it was converted into a bitter quarrel. He wished to speak with all respect of the legal profession, which no doubt had its traditions; but it certainly did seem to him that for the administration of justice in building matters the system of litigation under which the architectural profession at present groaned was very much of a failure. As architects all knew, even the very youngest of them, there was something about bricks and mortar that lawyers could not understand: they never got at it by any chance. A solicitor who was very much interested in his client's position might, after taking a little trouble, possess himself of some vague knowledge of what the dispute was all about; but as to the barristers, they never succeeded in obtaining the faintest glimmer. As he always told them, "You deal with words, and not things; you deal in abstractions, and there are no abstractions in bricks and mortar." Now he wished to say that, in his opinion, all building disputes ought to be settled by architects,—the lawyers ought never to be allowed to come in at all. He said that advisedly. He had been concerned in a great many cases of litigation for a great many years, and he never knew a building dispute settled in a court of law except on a false issue. The way it was done was this: the business of the opposing counsel was to mystify the judge; the business of the judge was to find his way by hook or by crook. They never believed the word of any of the professional witnesses, because they did not understand what they meant, and the easiest way out of a state of total utter darkness was to disbelieve. The process was perfectly simple. One counsel raised persistently one false issue; the other counsel raised with equal persistency another false

* See *Builder*, vol. xlii., p. 158.

issue; and the judge raised a third. When, on the other hand, a building dispute was referred to an architect or surveyor, even though he were only a man in moderate practice, albeit a man of experience, the process, although irksome and tedious, was more satisfactory, and far less expensive, for such disputes were made unnecessarily expensive by the intervention of the lawyers. The arbitrator heard both sides of the case patiently, and gave his decision on practical grounds. Such decisions very frequently consisted in splitting the difference and dividing the costs. That was a thing which the lawyers never did. They must always have one man altogether in the right and the other man altogether in the wrong. It should be borne in mind that the truth was to be found between extremes. In conclusion, Professor Kerr said he thought the time had come when the architectural profession,—which was becoming a very important and highly-regarded profession,—ought to take seriously into consideration the way to manage building disputes without the serious litigation which was the bane of this country. It was a question which ought to be taken up by the Institute; but, when he compared the questions which the Institute and the Association had respectively taken up, and found that the Association had been perhaps quite as successful in obtaining its ends as the Institute had been, he saw no reason why the Association should not take up this question, although in a quiet and unambitious way, with the view of leading the Institute to take it up hereafter. The matter was an exceedingly important one, for building disputes would arise, and they ought to be settled as speedily and as cheaply as possible.

Mr. J. Osborne Smith, in moving a vote of thanks to Mr. Gale, deprecated the suggestion of employing pupils as clerks of works. He agreed fully with the necessity which existed for architects to be thorough masters of the sanitary details of their buildings, for his experience of the so-called sanitarian specialists was that they were most impracticable men.

Mr. S. Flint Clarkson, in seconding the vote of thanks, was of opinion that "architect and surveyor" was the correct designation for a man who fulfilled the almost cyclopædic duties enumerated in Mr. Gale's paper as coming within the scope of professional practice.

Mr. F. W. Farrow, in supporting the motion, suggested that the legal difficulty as to the ownership of drawings might generally be compromised by the architect giving his client a plan of the building, showing all drainage arrangements, &c., with, possibly, in addition, a small perspective view.

A Member, whose name did not transpire, expressed his concurrence with the stress which had been laid upon the importance to architects of a thorough knowledge of sanitary matters, so that they might do their own sanitary work without calling in the services of the expensive sanitary engineers, or the plumbers who were so fond of using that designation.

The Chairman having put the motion, Mr. Gale said a few words in reply, and the meeting terminated.

ST. KEW CHURCH.

THE restoration of this church, which is one of the finest in Cornwall, is approaching completion. It has been undertaken under the direction of Messrs. Hine & Odgers, Plymouth, and the contractor is Mr. Bone, of Liskeard. The church consists of nave, north and south aisles, chancel with side chapels, a lofty tower at the west end, and a south porch. Originally the structure was unusually rich in carved Perpendicular timber work, but little has been allowed to remain except in the roofs, which are all of the wagon type with carved ribs and cornices, the former bossed at the intersections and with angels at the feet. All these parts in modern times had been periodically coated with yellow wash, and the plain panelled spaces whitelimed. Wood has taken the place of plaster in these spaces, and the carved roof-work has been cleaned and repaired, and the bosses and angels in the chancel have been richly illuminated as they were of old, and in keeping with one decorated figure, which was discovered in the progress of the works, and which has been reset in its original position. All plaster has been removed from the internal surfaces of the walls, and the masonry pointed throughout. The granite arcades and dressings have been cleaned and repaired, but the ancient tool-marks have not been interfered with. A lofty screen of oak, richly traceried, will divide the chancel and chapels from the nave and aisles, and there will be parcloses between the chancel and the chapels. A piece of the ancient screen which had escaped destruction, and which has been worked in, served the architects as a key to the elaborate details necessary for the new screen-work.

Permanent oak seats with carved ends, corresponding with one or two existing old ones, occupy the eastern portion only of the nave. Under these and the chairs, in other parts, the floor will be of wood blocks, laid herring-bone fashion. The choir-stalls, of oak, are traceried and carved from the architects' design. The stall-ends terminate with figures of angels in adoration.

In the east window of the north chapel were numerous fragments of old painted glass, so covered with dirt that nothing could be made of the subjects; and besides, there was a box full of other pieces. These were all entrusted by the architects to Messrs. Fouracre & Watson, stained-glass artists, who have put the pieces together, and successfully deciphered the subjects. The result is a most beautiful and almost perfect window of the fifteenth century, illustrating the life of Christ. Some small parts of the canopies and a few of the inscriptions are alone missing. The legends which remain are in very curious English:—

"Here owr Lord rydyth ynto Iherlm."
"Here a: washyth hys dicypylys fete."
"Here a: prayyth to the fader:"
"Here O: Lord ys skorgyd."
". . . . . byfore pylat."

The date of the window is 1469, as shown by an existing entry referring to it in the accounts of the mayor and churchwardens of the neighbouring town of Bodmin.

In another part of the church are remains of a fine "Jesse" window.

The church plate of St. Kew is almost of unique interest and include a hanap or chalice, of English manufacture, of the date 1598. It is of great size, and is a fine specimen of Renaissance work in silver.

In the restoration of this church the Archbishop-designate of Canterbury has taken great interest.

NORTHERN ARCHITECTURAL ASSOCIATION.

THE quarterly meeting of the Northern Architectural Association was held on Tuesday, February 20th, in the Old Castle, the president, Mr. John Tillman, of Sunderland, in the chair. There was a good attendance. Mr. Oliver moved: "That the general rules of the Royal Institute of British Architects for the regulation of architectural competitions be adopted by the Northern Architectural Association, and that printed copies of the same be distributed by the secretary." He said it was pretty well known that the Corporation were about to erect several extensive blocks of buildings in various parts of the city, and that they had volunteered the information that the designing of these should be submitted to public competition. He (Mr. Oliver) being a member of the Corporation could not, of course, become a competitor, but he hoped to be of service in conjunction with both bodies, viz., the Corporation and the Architectural Association. He believed Mr. Laws, the City Engineer, entered heartily into the recommendations of the Council, and, so far as he had been able to learn, every member of the several committees wished to carry out the resolution of October, 1881. The Royal Institute of British Architects, he continued, had given years of attention to the question of competition, and it was one of the great art institutions of the country. He thought they could not do better than adopt their general rules, which fairly met the mere architectural adventurer and gave the balance of influence to the honourable practitioner, at the same time securing the interests of the public. Mr. Oliver concluded by saying that he believed the Council wished to do justice to the architectural profession, and that the legitimate members of that profession were most anxious to do justice to the works entrusted to them, and expressed a hope that the working out of the new *régime* would result in improved art culture, both in the profession and in the public.

This was seconded and carried.

Mr. Newcombe proposed that a copy of the general rules be forwarded to each member of the Newcastle and Sunderland Corporations, with a request that they would give them their best consideration, and adopt them in any architectural competitions they may decide to invite.

After an animated discussion the resolution was carried, and the meeting terminated.

STONE OF WESTMINSTER ABBEY.

THE following memorial has been forwarded by the Duke of Westminster to the Home Secretary on the subject of the injury done to public buildings in Westminster by the excessive emission of smoke, especially to Westminster Abbey and the Houses of Parliament, urging a stricter enforcement of the provisions of the existing law, which are believed to be adequate for the suppression of much of the existing nuisance from the potteries. The memorial was adopted at a meeting of the Council of the Smoke Abatement Institute, on the motion of Mr. Ernest Hart, seconded by Lord Algernon Percy, M.P.

Sir,—The undersigned memorialists, members of the Council of the Smoke Abatement Institution, and others, are desirous of respectfully calling your attention to the evils attending the excessive emission of smoke and other noxious vapours from furnaces connected with factories and workshops in the metropolis, and especially those connected with various potteries in the district of Lambeth.

Notwithstanding the serious injury to the Houses of Parliament, Westminster Abbey, and other buildings, which must arise from this cause, and of which recent evidence has been adduced, your memorialists have seen with regret that not even the powers of the existing Acts of Parliament passed to restrain this nuisance, are fully exercised.

By the Smoke Nuisance (Metropolis) Act, 1853, and the Amended Act of 1858, expressly including potteries, it is enacted that "the best practicable means for preventing or counteracting smoke" shall be adopted, and that any person in charge of a furnace who shall so negligently use such furnace as to cause a nuisance, shall, upon summary conviction for such an offence forfeit and pay a sum not more than 5*l*., nor less than 40s.; and upon a second conviction for such offence the sum of 10*l*., and for each subsequent conviction the sum of double the amount of the penalty imposed for the preceding conviction.

Nevertheless, in several cases recently tried before the magistrate sitting at the Lambeth Police Court, the prosecutions having been instituted in pursuance of the provisions of the Act, and the offences proved and convictions obtained, merely nominal fines varying from 2s. 6d. to 10s. have been inflicted. In some of these instances former convictions had been obtained.

In some other parts of the metropolis similar leniency had been shown to offenders against these Acts, and the objects of the Legislature have been defeated.

Your memorialists believe that investigation will satisfy you that these industries may be, and are elsewhere being carried on without excessive production of smoke.

Your memorialists pray,—

That you will cause investigation to be made of the circumstances here alleged, and that you will take such steps as may seem best to you to cause the Smoke Nuisance (Metropolis) Acts to be effectively carried out throughout London.

THE LATE MR. WM. SNOOKE.

WE announce with regret the death, on the 18th instant, of Mr. William Snooke, of the firm of Snooke & Stock, of Duke-street, London Bridge. Mr. Snooke, although calling himself an architect and surveyor, devoted most of his attention to the surveying part of his business, his partner, Mr. Stock, carrying out the architectural portion of the practice of the firm. Mr. Snooke was a man of great integrity and ability, and was much respected by all who knew him. His warm and impulsive nature sometimes brought him in conflict with opponents, but his sympathies were always on the side of the weak and the oppressed, and probably not many men made so few enemies.

Mr. Snooke held the appointment of District Surveyor of Rotherhithe and Hatcham, with a part of Camberwell, since 1847. The gross annual value of the district, as appears from the last return, is about 900*l*.

The Improved Wood Pavement Company (Limited).—The Directors' report, presented to the shareholders at the eleventh ordinary general meeting, held at the Cannon-street Hotel, on the 12th inst., stated that after making proper allowance for depreciation of plant, machinery, &c., the accounts show a balance of net profit of 5,526*l*. 19s. 5d., from which the directors proposed to pay the usual dividend of 5 per cent., which will absorb 4,112*l*., carrying the balance 1,414*l*. 19s. 5d. to "reserve fund," which would then stand at 7,964*l*. 13s. 6d. The directors are giving attention to private wood-paving works of all kinds, as also to the employment of the machinery for the trade. The report was adopted, and a dividend declared as recommended.

FILLONGLEY.

THE village and parish church of Fillongley, in the county of Warwick, stand upon the direct and ancient road between Coventry and Tamworth, six miles to the north-west of the former city. Here are the remains of two residences, indicated in the Ordnance Survey as "Castle Hill" and "Castle Yard," the term "castle" being applied, indiscriminately, to both. Castle Hill stands half a mile north-north-east of the church, Castle Yard a quarter of a mile south of it. Both remains are of the military type, and represent defensive works of very different ages and fashions.*

CASTLE HILL, much the older of the two, stands upon ground sloping gently towards the north-west and west, between two brooklets which, descending from the north-east and north-west, from two sides of a triangle, the apex of which, their point of junction, lies to the west. The ground is thus protected on three sides, and towards the north, where the brook lies in a small but deep valley, it has cut for itself a deep channel in the soft red sandstone rock, the protection afforded by which is considerable. On the whole, in a country presenting no very marked features, the position may be said to be well selected.

The earthwork, which bears the name of "the Castle," is somewhat of an oval form, about 180 ft. north and south, by 150 ft. east and west. It is enclosed within a ditch of variable depth and breadth, from 15 ft. to 20 ft. in breadth, and 6 ft. in depth on the southern or most exposed side, to 3 ft. and 4 ft. on the west. Towards the north the ditch is superseded, or nearly so, by a steep slope, falling towards the brook. The contents of the ditch have been thrown inwards to form a bank, which, therefore, is highest and broadest, or about 6 ft. by 20 ft. on the southern face, and is altogether, or very nearly, absent on the northern face. The entrance seems to have been on the north-east quarter, where the ditch is traversed by a causeway of earth, and the river bank cut through. It is probable that this principal work was covered by an exterior bank and ditch to the east and south, for to the west, about seventy or eighty yards beyond the ditch, are the traces of a scraped slope, cutting off the point of the triangle towards the union of the brooks. This was suited to the falling ground. To the south a bank and ditch would be necessary.

Beyond the north brook, a few yards from the earthwork, is a fragment of masonry, connected with a number of loose stones. These have been supposed a part of a castle in masonry, but more probably here was a small mill, and this a part of a dam to keep back the water of the brook. Probably the whole are the remains of a comparatively modern arrangement.

From the character and position of this earthwork it is evident that it is not Roman, and almost equally probable that it is not British. It is too small to have belonged to a tribe, and looks as though it had been the residence of a landowner of the seventh or eighth century who here resided with his family and dependents upon his or their private estate. So far as can be inferred, works of this character mark the fortified house, the *domus defensabilis*, of some early Saxon settler, before the period when the moated mound came into use, or when, for some special reason, it was not employed. Well palisaded round the inner circle, and protected in a similar, though probably less complete fashion, round the outer enclosure, such a work would afford a very fair shelter for the family within the circle, and for the tenants and cattle within the outer court.

THE CASTLE YARD.

This is of a very different character from the earthwork already described, of much later date, and with defences of a different type. This, however, is posted in a similar position to the former work, occupying a small triangle of land formed by the beds and junction of two brooks which flow down from the south and the south-east to meet and form the point of the triangle to the north.

In the space thus protected towards the north, west, and east, was constructed a rudely oval shell of masonry about 50 ft. east and west by 80 ft. north and south, traces of which are seen in five masses of stone rubble-work, of which four are overthrown and a fifth remains in its proper place. A light ridge connects these detached masses, and indicates the line of the curtain of which they formed a part. The fragment standing in its place seems to have been connected with a curved recess, or, perhaps, a well stair, but the others have been overthrown by gunpowder. The whole was on a small scale, and there are no visible traces of towers or gate-house. The earth and rubbish heaped up in the interior of the area may cover foundations, and, no doubt, a light excavation here would disclose the plan of the whole structure and the place of the entrance, which, probably, was towards the east.

Outside the walled area the ground falls slightly, and there are traces at about 30 yards' distance, towards the south, of a ditch and internal bank protecting this, by nature, the weakest side. The valley towards the east is occupied by one of the brooks which flows a few feet only from and below the wall. There is no trace of any second or outer circle of masonry, so that probably the castle was composed of a single ring wall, possibly set with turrets, but if so, of no great size.

The whole castle must have been a very inconsiderable place, though from the steepness of the little valleys between which it stands, and the marshy character of the ground watered by the brooks, it evidently possessed much passive strength, and if garrisoned by determined men, could have held out for some time.

Fillongley is unnoticed in any record older than the Conqueror's Survey. We learn from Domesday that "Filungelei" contained two hides of land, of which one half hide belonged to the Bishop of Coutances, and was held by Lewin; a second by the monks of Coventry; a third by a certain Alsi, who held it from before the Conquest; and a fourth by Robert le Despenser, which, though of less value, contained the church. Alsi may have resided upon the Castle hill. The half hide held by the monks is identified with Old Fillongley, on the western side of the parish, and was held of them in the reign of Henry III. by Gerard de Alspath, whose name is preserved in Alspath Hall, in the south-west quarter of the parish. He held it as a fourth part of a knight's fee. A part of this holding passed in some way from the ownership of the monks, who, in the time of Edward III., held in it one-eighth of a fee of Lord Hastings. Part of Le Despenser's share passed to the Marmions, and thence, it would seem, to the Earls of Leicester, one of whom probably enfeoffed of it either Walter or Hugh de Hastings, one of the earlier members of that family, who long continued to hold it of the Marmions and Le Despensers. Thus the family of Hastings were of Fillongley in the reign of Henry I., and it speedily became their chief residence in Warwickshire, and the nucleus of a considerable estate. With the church was the advowson which, in the reign of Edward III., Lawrence Hastings, Earl of Pembroke, sold to Clinton, Earl of Huntingdon. Fillongley, though it appears in the inquisitions of the Hastings family, is not mentioned as a castle, being, in fact, too inconsiderable to be claimed by the crown, and so entered upon the public records, but it seems to have remained the chief, if not the only, residence of the family, until Henry de Hastings, in the reign of Henry III., married Joan de Cantelupe, who became a very great heiress, so that John, their son, inheriting the Castle of Abergavenny, resided there, as did occasionally his descendants. On the death of the last Hastings, Earl of Pembroke, Fillongley passed with much of his property to the Beauchamps, and so to the Nevilles, who held it when Dugdale wrote his very valuable history.

Fillongley Church contains no monuments of the Hastings family, who buried at Polesworth and with the Grey Friars at Coventry.

G. T. C.

* See plans, p. 244.

Electric Lighting and Ballet-Girls.—The ballet at the Princess's Theatre, Manchester, in which twenty-six ladies take part, has for the past month been danced nightly by the light of small Swan lamps placed in a flower on each lady's head. The current is supplied by a small battery, the weight of which is about 1½ lb., carried on the back of the dancer, as at the Savoy Theatre. None of the ladies are at all frightened; in fact, they like it so much that the principal dancer, Miss A. Holt, has arranged to have her dress covered with the lamps, which will be done ere this is in print. The arrangements have been carried out by Mr. H. Bury, of 46, Market-street, Manchester.—*Electrician.*

CROXALL MOUND.

THE parish church of Croxall stands upon the east or right bank of the Mease, a few feet above its flood level, and about a mile above its junction with the Trent. The Trent, but a few yards higher up, has received the waters of the Tame, each river traversing a broad and flat valley, subject to extensive inundations. In former days, before the land was enclosed or the water-courses kept clear of obstructions, this low and wet tract must have presented an almost impassable barrier, protecting the eastern villages from attacks upon the western or British side.

Of the origin of Croxall nothing whatever is known. Crux or Croc may be the British Crûq or Cric, as in Crickhowall, or there may have been preserved here one of those fragments of the true Cross which were at one time rather freely scattered and believed in, and of one of which Crosston is thought to preserve the memory. "All" is probably the Saxon Hall or "Aula" of the early proprietor. Domesday is silent as to the parish and church, naming only the manor. No doubt the manor or private estate is older than the parish, which, however, may date from the middle of the tenth century; but the church may well be much older, and may have been attached to the original residence of the English lord, and so not greatly later than the establishment of private property in land, and the introduction of Christianity. The Mease is at this time here the boundary between the shires of Derby and Stafford, the church and most of the parish lying in the former; one hamlet, however, lies beyond the stream, in Staffordshire, so that the limits of the parish are probably older than those of the shire.

Croxall is fortunate in having become the subject of a local history. Mr. Ussher's recent and richly-illustrated quarto dives deeply into the descent of the property, and is copious upon the pedigree and heraldry of the lords of the soil, their residences while living, and their sepulchral memorials when dead. He gives copies of their principal muniments, settlements, wills, and inquisitions, large extracts from the parish registers, particulars of the church architecture, plate, and bells, and lists of names of places and of public ways, accompanied by local surveys, together with copies of the tombstones of the humbler forefathers of the parish. Altogether, the volume gives a very full and particular, and, as it is believed, a fairly correct account of this very interesting parish.

The text of the present remarks is the only notable object in Croxall upon which Mr. Ussher has but little to say, and yet it is without doubt older than any other work of man within the parish, and probably older than the parish itself, and as old as the manor or the appropriation of the estate. This object is a small and mutilated, but still distinct, moated mound, which stands on the immediate bank of the Mease, due south-east of the church, and upon the margin of the churchyard. Mr. Usher gives its height as 12 ft., and its circumference as 40 yards. Both dimensions are liberal. The mound stands on the convex side of a bend of the river, and its adjacent or south-west face slopes directly towards the water, rendering a ditch at that point unnecessary. Towards the north the ditch has been, more or less, recently filled up, probably to allow of the carting away of the substance of the mound, which has been cruelly dealt with on this side, reducing the remainder to a crescent in plan, and evidently deducting not a little from its original height. On each side, however, towards the east and west, the ditch is tolerably perfect, and runs out upon the slope as it approaches the river. It is abundantly evident that this has been a moated mound, the moat encircling it on three sides, and giving place to the river on the fourth.

The court, also banked and moated, usually attached to these mounds, if it existed here, must have been placed to the north or east. The ground in each direction is rugged and irregular, and at one point, to the north, bordering on the high road, are traces of what seems to have been a bank and a ditch. Towards the east the ground is still more disturbed. It is said the village once stood in this direction, and that the surface irregularities belong to its foundations. Here, also, it is said, was the camp of a large body of soldiers brought by Henrietta-Maria to reinforce her husband's army in 1643. However this may be, the

aspect of the mound, its ditch, and its position near the church, all point to its having been a motte or burh, such as the Lady of the Mercians threw up at Tamworth in 913, and of which the not distant parish of Sekington presents a very fine example.

It appears, however, that, when opened in 1800, human bones were here found. Had these remains been contained in an urn or cyst, showing that they were of the age of the tumulus, or lain in such a position as to show that the earthen heap was cast up over them, its sepulchral origin would have been clear, but there is no evidence of this kind. For all that is recorded it may have been that the interment was of a date long subsequently to the mound, and connected with the contiguous churchyard. To judge from present appearances, this mound was the site of the timber residence of some Saxon lord of the soil, probably the same, or the descendant of the same, who founded the church and acquired and constituted the estate or manor. G. T. C.

HOUSE AT FINCHLEY.

THIS house, which is now nearly finished, is being built in Nether-street, Church-end, Finchley, for Miss T. M. Boulton.

The facing bricks are red Bracknell, with Portland stone dressings, and the roofs are covered with dark-coloured Broseley tiles and with Cooper's ridges and finials.

The internal joinery on the ground and first floors is in polished pitch pine, the ground-floor doors having moulded heads. The principal staircase, which is constructed with close strings and newels, is of polished pitch pine, with teak newels, handrails, and mouldings.

The outer strings of this staircase have handsomely-carved pateræ in sunk panels.

The ceiling of the staircase is panelled in pitch pine, with moulded ribs, and the entrance-hall is paved with ornamental tiles.

The stained glass throughout has been successfully done by Mr. Brunton, of Hurley-road, Kennington.

The building has been carried out by Mr. William Goodman, of Hartham Works, Holloway, his contract for the same being 2,699*l.*, from the drawings and under the superintendence of the architect, Mr. Thos. Newell, of Dashwood House, New Broad-street.

THE NEW STADTTHEATER, BRÜNN.

THIS new theatre, the opening of which took place at the end of last year, possesses features entitling it to a more than passing notice. For example, it was one of the first theatres lighted throughout by electricity. In 1870 the old Brünn theatre, of very modest dimensions, was burnt down for the fourth time,* and it was some time before a beginning was made in rebuilding it. When the matter was once taken in hand, however, under the energetic direction of Bürgermeister Winterholler, the preliminary works were soon completed, and the design of Herren Hellmer and Fellner, architects, was selected for execution. Building operations began on the 18th of July, 1881, and on the 31st of October, 1882, the theatre was finished, at a total expense of not more than 50,000*l.*

The new theatre has the advantage of being built on a slightly rising site, and perfectly isolated, the nearest buildings being at least 50 ft. away from it. It is erected in the style of the Italian Renaissance. The principal front is its chief feature. Upon a balcony resting on pillars, and serving as an approach, rises a pediment supported by six Corinthian columns, which in its turn is surmounted by a semicircular pediment, over which beams the figure of Music, flanked by genii. In the great pediment is represented the triumphal progress of Dionysos, accompanied by the muses representing dramatic art, whilst reliefs between the columns and reclining allegoric figures over the windows point to the artistic destination of the building. All the statuary, both outside and inside the theatre, is executed from designs by the sculptor Friedel, of Vienna; the other sculptural work is by the sculptor Schönthaler. Building operations were superintended by the architect Nebehosteny, of Vienna.

* According to Fölsch, *Theaterbrände*, the first theatre at Brünn was destroyed by fire in 1693.

The interior of the theatre is elaborately decorated in the baroque style. This is apparent already in the vestibule, to which access from the street is gained by seven entrances. The staircase forms one of the chief points of attraction. A display of statuary and arabesques, the spiral forms of stairs* and balusters, and the rich ornamentation of the consoles in the loggias create an impression which may be described as expectant. The auditorium, by the mild light supplied by glow lamps, offers an harmonious and tasteful view. The faces of the boxes and galleries are white, picked out with gold, whilst the background and draperies of the boxes, as well as the cushions of the seats, are of crimson hue. Where the horseshoe form of tiers passes into the circle of the ceiling, six frescoes have been introduced. Finally, the artistically executed curtain, by Leffler, forms a fitting conclusion to the harmonious whole. Sitting-room was at first provided for 1,500 persons, but since the destruction of the Vienna Ringtheater, that number has been reduced to 1,360, the space thus gained being utilised in providing greater facility for egress.

An important feature of the theatre is that, as in the auditorium so on the stage, care has been taken, by the light of recent experiences, to guard against fire. The Brünn theatre has, not one, but two iron curtains,—the usual one at the proscenium opening, and the second one separating the back stage from the front. These curtains are, in order to ensure greater stiffness, not flat, but constructed of corrugated sheet-iron. The proscenium curtain is painted with the design of a Persian carpet which hangs down in wavelike folds, so that the deception is complete. The iron curtains are moved by an hydraulic press, the lever of which need only be set to cause the curtain to rise or to descend in between thirty and forty seconds. In case of a fire, however, the iron curtain may be caused to drop instantly from three different parts of the theatre. Gas and smoke find an exit by a chimney ten mètres square, which opens automatically in case of fire. Vaulted corridors with iron doors run between the dressing-rooms, and a party-wall, which, together with the iron curtain, forms an impenetrable whole, separates the stage from the auditorium.

A striking feature of the new theatre is the application of the electric light, which, as already mentioned, has been introduced throughout the whole house. Vestibule and staircase are lighted by five Gramme arc lamps of 1,000 candle-power each; the whole of the auditorium, the corridors, and the stage, by 800 Edison glow-lamps. A most effective play of coloured light is produced by green, red, or blue gelatine skins stretched over the glass bells of the lamps, the display of the various-coloured lights being effeeted by simply turning different switches. Everything worked well at the opening performance of the theatre, which took place on November 14th last, when Göthe's "Egmont" was produced.

We give in our present issue an exterior view of this model theatre.

* This sounds more picturesque than safe.

LONDON STREET ARCHITECTURE.

BELL-YARD, FLEET-STREET.

THE premises, Nos. 7 and 8, Bell-yard, Fleet-street, occupy the site of some ancient timber houses of a type now fast disappearing from our London streets. Though of picturesque effect, owing to their gabled fronts and overhanging stories, they had been so much altered and modernised that no details of interest remained.

No. 7, the building first erected, for Mr. J. K. Metherell, has a frontage of 13 ft. in Bell-yard, and extends a depth of 30 ft., giving another frontage to Crown-court, Chancery-lane, in the rear. It comprises, on the ground-floor, a shop, the full depth of the premises, with basement belonging thereto beneath. The four other stories contain each two rooms, and are let out as offices. The materials used are red Fareham bricks and Portland stone.

Soon after the erection of this building, the freehold of the adjoining site was acquired by Messrs. Maxwell & Son, the well-known law publishers, and the rebuilding of the premises was at once commenced, the building being planned to suit the requirements of their business. The ground-floor contains the public office; the first floor, Messrs. Maxwell's private room; and the upper stories are used as warerooms.

This building has a frontage of 21 ft. in Bell-yard, and a nearly equal frontage in Crown-court. The elevation is of a more decorative character than that of the first built house, and is entirely executed in Portland stone.

The cost of the entire block amounted to 4,341*l.*

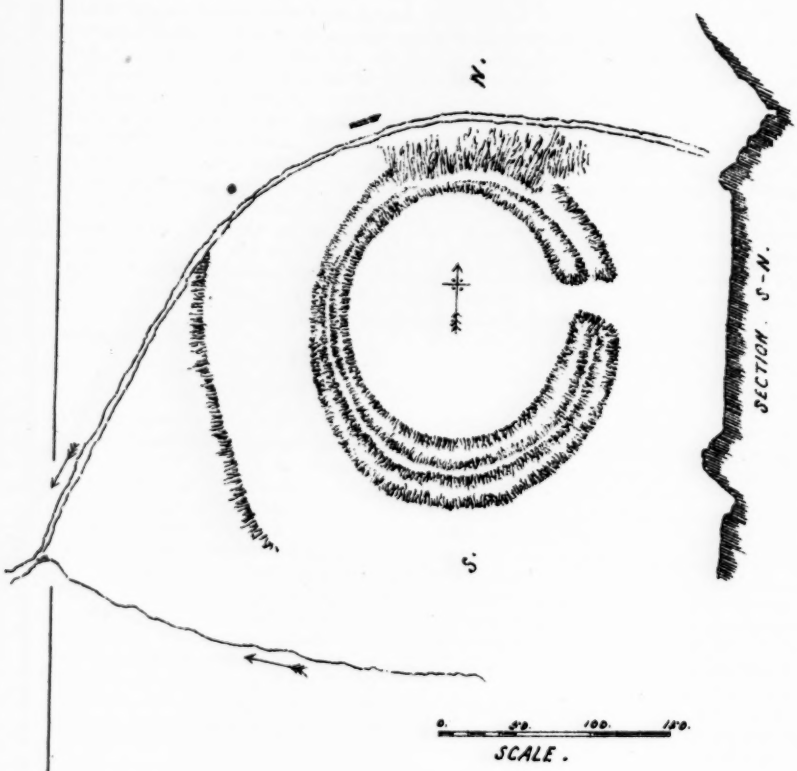
The builders for the first portion were Messrs. Patman & Fotheringham, of Theobald's-road; and for the second, Messrs. Scrivener & Co., Fitzroy-road, Regent's Park; Messrs. Isaacs & Florence, of 3, Verulam-buildings, Gray's Inn, being the architects.

NEW ENTRANCE FRONT, ST. JAMES'S HALL, PICCADILLY.

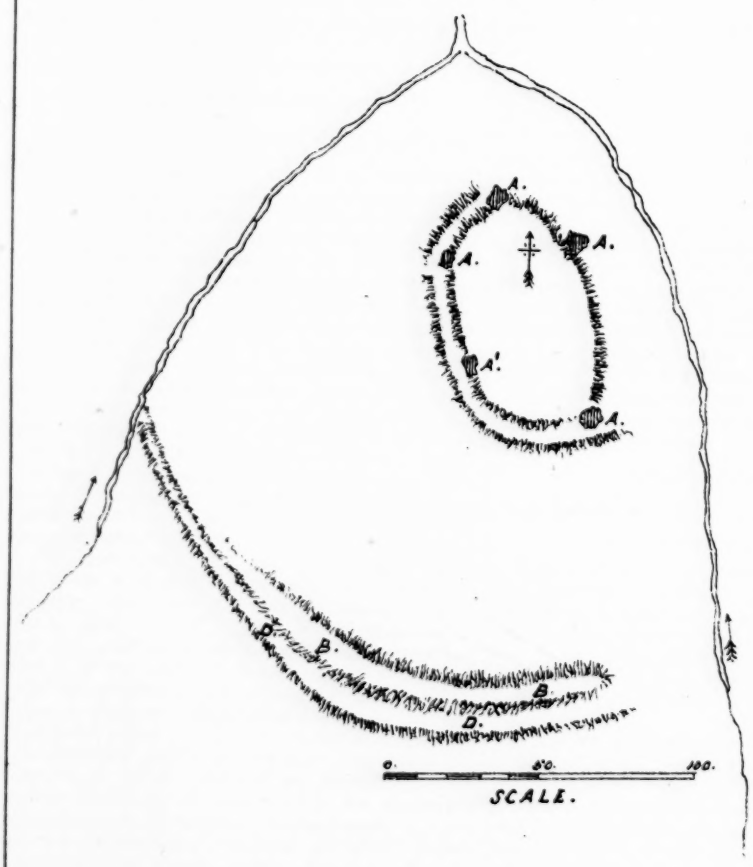
THE new entrances of St. James's Hall are erected after the Early English style, without any very strict adherence to old examples. The front is of red Mansfield stone and Luton bricks, with a few mosaics in the panels, the principal work in mosaic representing Music. The top of the tower is over 100 ft. from the pavement. The entrance is divided into three arches, supported upon granite columns, each hewn out of a solid piece of granite. There is a porch, from which the new entrance-hall is entered. This will be in future the principal entrance for the building. The total area of the entrance-hall is about 70 ft. by 30 ft. It is divided by clusters of columns into three aisles, from which spring the arches and the groining of the ceiling. The ribs are executed in Caen stone, the panels of the groining being filled in with blue mosaic, and powdered with gold stars and the various signs of the zodiac. The columns are of Burmantofts china, the caps and bases being Caen stone. The floor is laid with mosaic. The wall panels are filled in under the arches with tiles. In the centre of each panel are the arms, in relief, of the royal houses of Great Britain, and the walls between the columns will be covered by handsome tapestry curtains. In the centre aisle rises the main staircase direct to the great hall. The staircase is constructed of Caen stone and Burmantofts china columns. The steps are of white Sicilian marble. The staircase is flanked on each side with arches filled in with tracery, the openings being filled in with stained glass. Over the upper portion of the grand staircase rise ribs of Caen stone, forming a dome, the panels of which are filled in with stained glass. From this dome the staircase will be lighted in the day, and at night by a corona, executed in nickel and brass. On the left of the staircase will be the entrances into the Moore & Burgess Hall; on the right, the entrance into the upper parts of the Great Hall and the restaurant, Mr. Ambrose Austin's new ticket-office being on this side, next to the entrance-doors.

At the top of the staircase, next the entrance to the Great Hall, will be a new withdrawing-room for the accommodation of the Prince of Wales and members of the Royal Family when visiting the Hall. In the main building, next the street, over the entrances there will be a new small hall, while the floors above will be used for the accommodation of the company, as offices, &c. There is also extensive cellarage. The whole of the new entrance is in fireproof material, and the new staircase, it is asserted, could empty the Great Hall in a few minutes. Appliances for the extinction of fire are fixed in prominent positions over the building. The general contractor is Mr. Herbert Lea, of 4, Warwick-street. The fire appliances are by Messrs. Shand & Mason; the terra-cotta and Burmantofts ware by Messrs. Wilcocke, of Leeds; the mosaics by Mr. Rust; the gasfittings, &c., by the Wheathill Foundry Company; the stained glass is by Mr. Ion Paice; the stonework by Messrs. Mowlem, Chelsea; and the hangings are by Messrs. Maple. The works have been executed under very great difficulties, as the entrance to the halls has had to be maintained open during the whole rebuilding. The chief foreman, Mr. Davis, has had the great weight of this difficulty on his shoulders, and deserves much praise, as well as for moving and placing the heavy girders and stones in an extremely limited space without any accident.

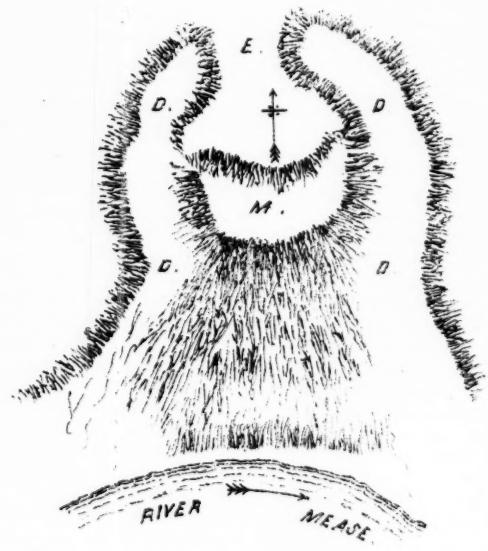
The architects are Messrs. Walter Emden & Co. The quantity surveyors are Messrs. Evans & Deacon.



FILLONGLEY CASTLE.



A. MASSES OF OVERTHROWN MASONRY.
SHEWING THE OUTLINE OF THE BUILDING.
A'. MASONRY IN PLACE.
B. BANK OF EARTH.
D. DITCH.



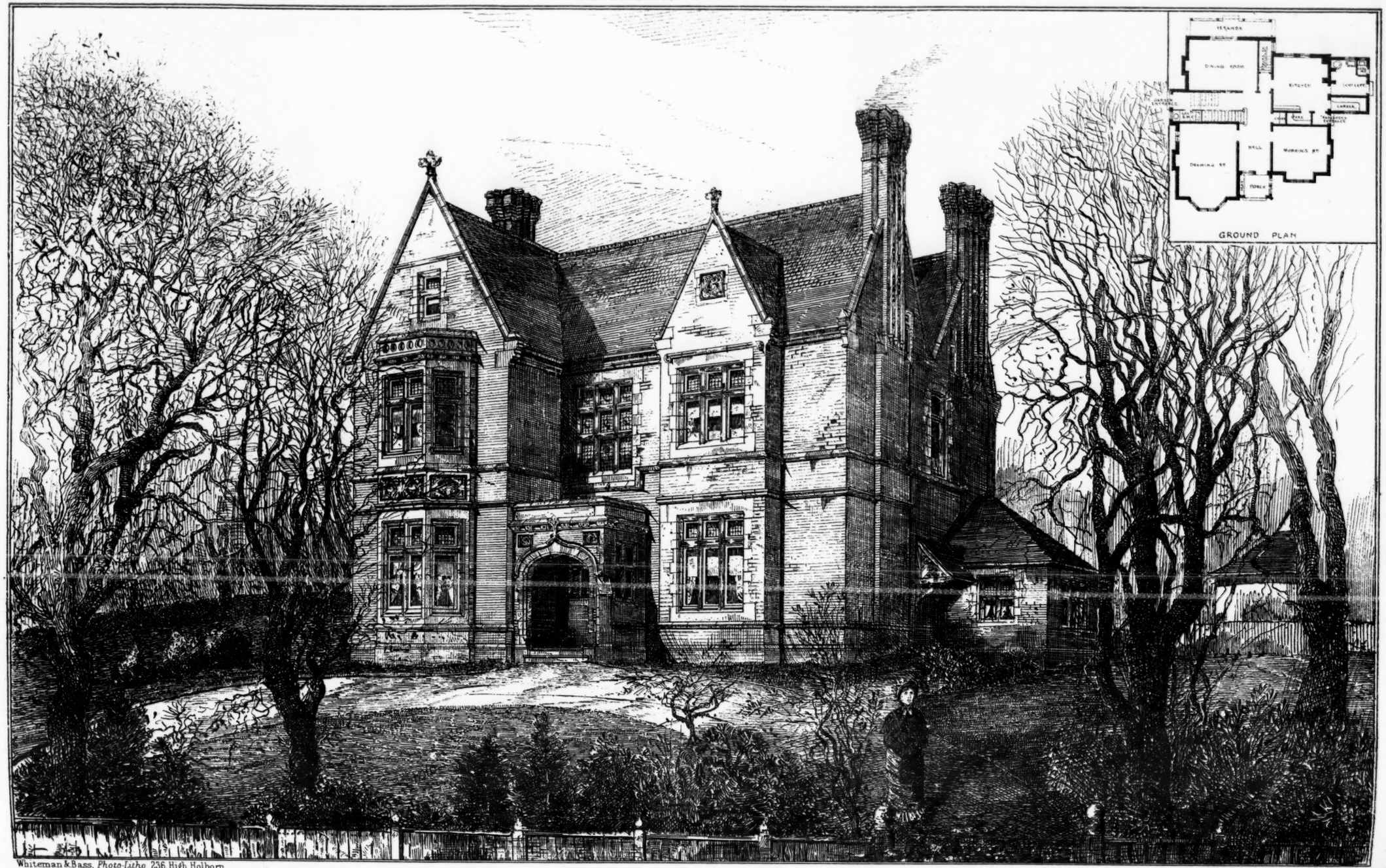
CROXALL MOUND.

D. DITCH.
E. LATE FILLING UP.
M. MOUND.

0. 5. 10. 15. 20. 25. 50
SCALE OF FEET.

C.F.Kell, Photo-Litho. Castle St Holborn.

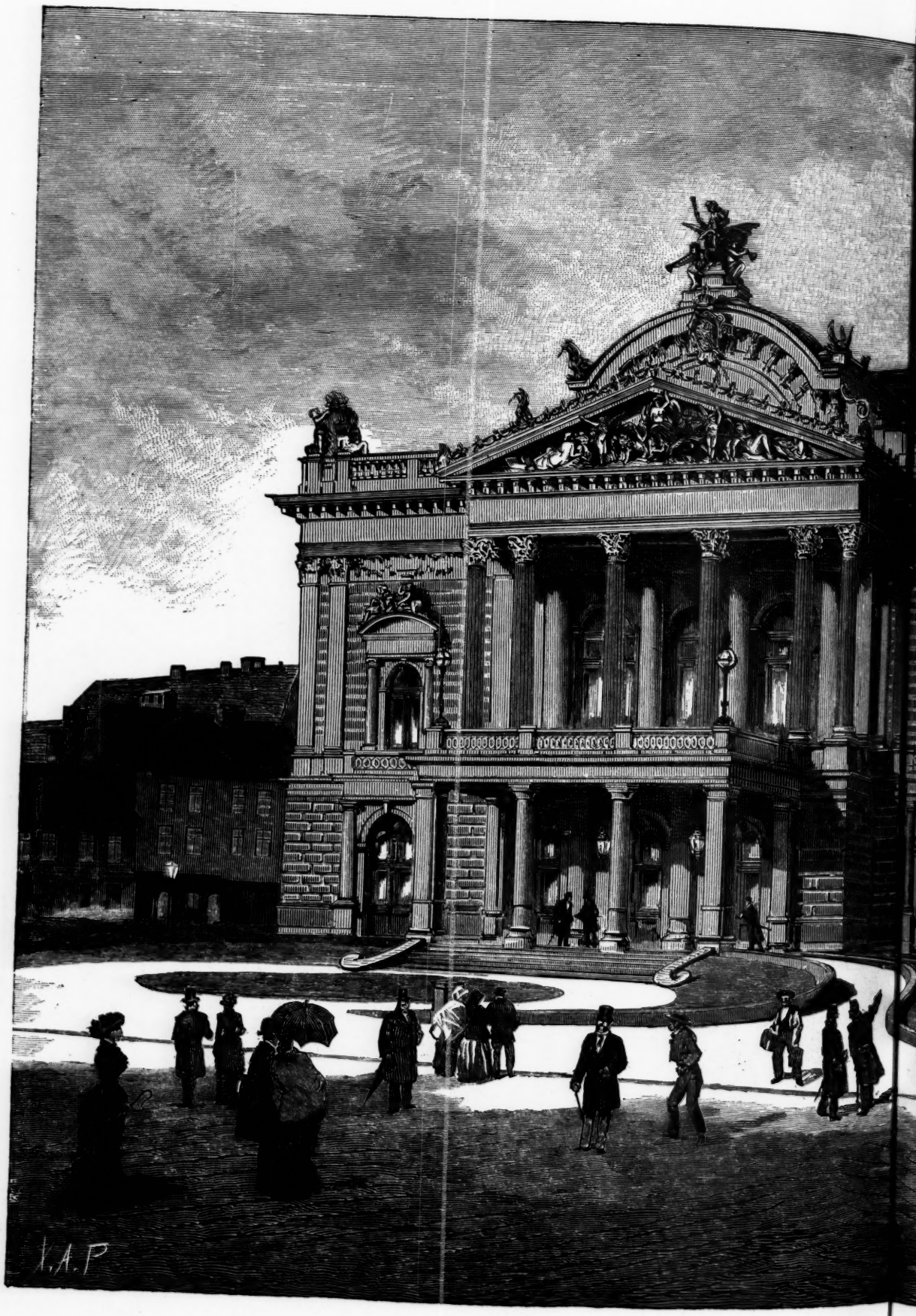
Wyman & Sons, Printers, Gt Queen St.



Whiteman & Bass, *Photo-Litho.* 236, High Holborn.

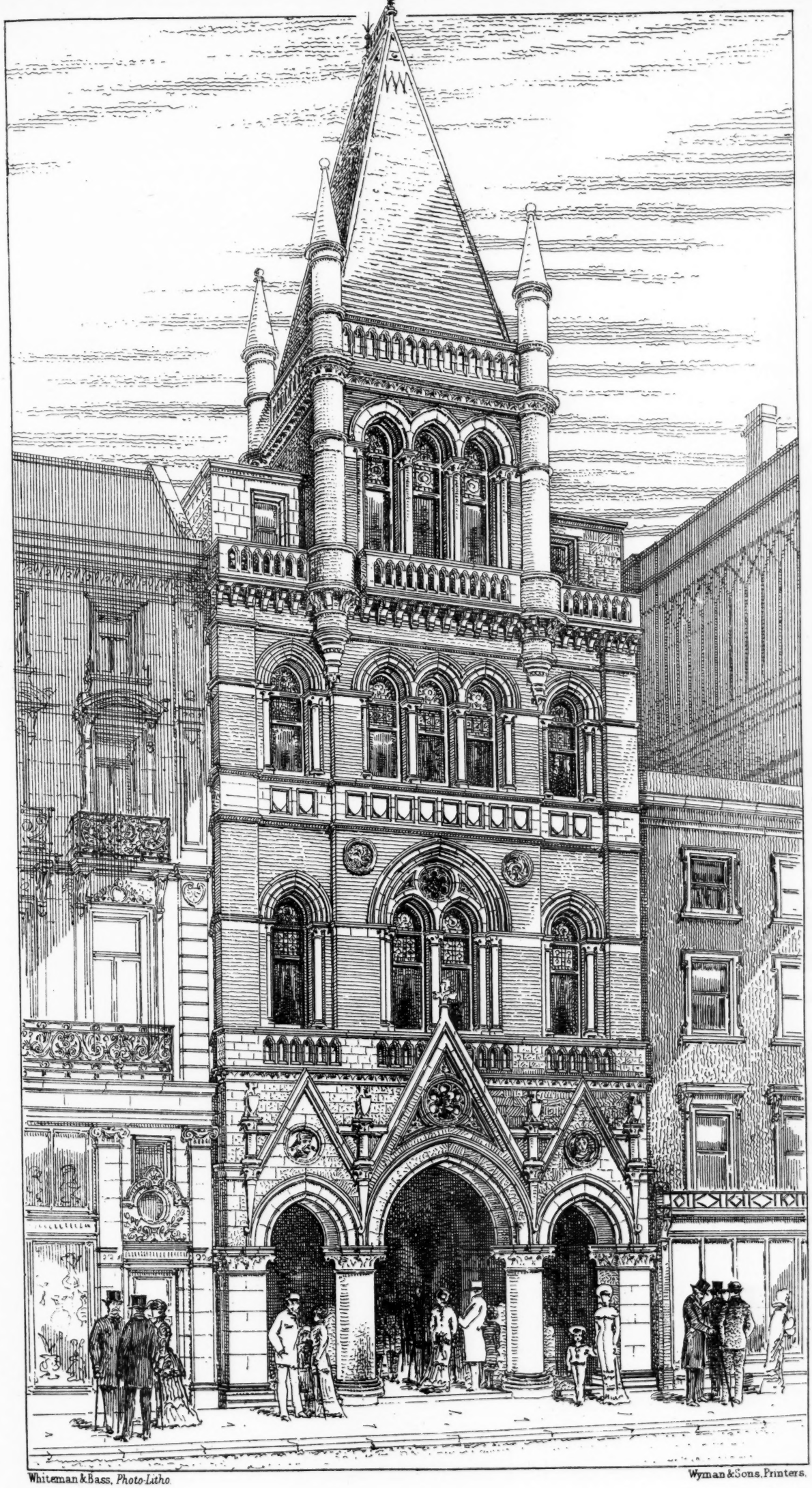
HOUSE AT FINCHLEY.——Mr. Thomas Newell, Architect.

Wyman & Sons, Printers, C^t Queen St



THE NEW STADTTHEATER, BRÜNN.—Her

N.—HERREN HELLMER AND FELLNER, ARCHITECTS.



Whiteman & Bass, *Photo-Litho.* Wyman & Sons, Printers.

NEW ENTRANCES TO ST. JAMES'S HALL, PICCADILLY.——MESSRS. EMDEN & CO., ARCHITECTS.

C.F.Kell, Photo-Litho. Castle St. Holborn.

Wyman & Sons, Printers, Gt Queen St.

HOUSES IN BELL YARD, FLEET STREET.——Messrs. Isaacs & Florence, Architects.

THE PROCESS OF OBTAINING SANCTION FOR PUBLIC WORKS IN GREAT BRITAIN.*

BEFORE commencing the subject of the compulsory purchase of property, to acquire which is one of the main objects of a private Act for public works, it will be well to give a slight sketch of the tenures by which the land in England is held.

The land at the Conquest was apportioned to the various Norman knights who joined William the Conqueror in his victorious expedition, and with the grant was imposed the duty of furnishing a certain number of knights in time of war. Thus all the manors in the kingdom were held of the Crown, and it became the principle that the king is the lord paramount and possessor of all the lands in his kingdom.

All manors and lands, then, were held of the sovereign-in-chief by two kinds of service :—

1stly. Tenants "per baroniam." These constituted the great barons of England, who were bound to attend the general councils of the realm, the forerunners of our present Parliaments, their number being estimated at about 250. 2ndly. Tenants in chief by knights' service. This class was lower than the preceding, and is supposed to have numbered about 750.

"The whole feudal system was rooted in the land, and held on to it like a forest. To have so much land was to be a baron; to be a baron was to be liable to furnish so many knights; to be a knight was to hold land perhaps of the king, perhaps of a great baron."

Such was the ancient system of land tenure which continued in force until the whole of the feudal tenures were abolished at one sweep in the reign of Charles II. But the theory that the king holds all the land in the kingdom, by inference for the general good of the nation, still survives, and the theory is put in practice by the compulsory purchase of land for a public undertaking, which must, however, be of such great public advantage as to compensate the nation for the inconvenience its individual members personally affected may suffer.

Such being a slight outline of the theory of land tenure, we have now to consider the process for the acquisition of powers to construct those public works which have been the cause of the greatness of England of the present day.

Powers for the compulsory purchase of land in the United Kingdom can only be obtained by an Act of Parliament, but there is no limitation as to who may apply for one, and any company, corporation, or private individual may do so. Such a private Act must pass through all the stages of the most important public Bill, a procedure which necessarily entails, especially in opposed Bills, considerable cost on the promoters. In dealing with the various stages through which a private Bill has to pass, the author will only indicate the purely legal proceedings which are almost entirely, and in most cases altogether, beyond the province of the engineer, and with which he cannot be expected to deal, whilst he will discuss at greater length the rules and practice which more nearly concerns the engineering profession.

The procedure before Parliament is framed on the Standing Orders of both Houses, which have been drawn up with the object of giving due publicity to the application; so that all parties who may be in any way affected by the proposed Bill, may have a fair opportunity of stating their objections to the scheme; and these same Standing Orders are the guide to regulate the procedure to be followed in the progress of the Bill through its various stages, until it is either finally rejected or receives the Royal Assent, and becomes a part of the Law of the land.

Let us now suppose that application is intended to be made to Parliament for a private Act, and follow the routine that will have to be observed. Bills are divided by the Standing Orders into two classes. With the first engineers are but little concerned, Bills to authorise the construction of works such as railways, docks, canals, waterworks, &c., being included in the second. Firstly, a notice by advertisement has to be inserted in the months of October and November, or either of them once in the London, Edinburgh, or Dublin *Gazette*, as the case may be, and in three successive weeks in a newspaper published in the county in which the works are to be situate; and if the lands are in more than one county, then, in addition to the publication in each county, in a London daily newspaper as well, or a Dublin or Edinburgh paper published at least twice a week, if the Bill relates to either of those countries. The effect of this Standing Order is that if a branch line joins the existing main line of a great company running through several counties, it will be necessary to insert the notice in a London daily paper, although the works proposed may be all in a distant county. The only part of this advertisement which generally affects the engineer is the description of the termini, which must be stated with sufficient exactness to enable any one interested to identify the spot within a few yards.

In order to avoid omitting the mention of any parish which may be touched by the line of works, it is usual to include every parish adjacent, and state that the works will pass through some, or all, of them.

In the case of tramways, the notices must specify at what points, and on which side of the street it is proposed to lay the tramway, so that for a distance of 30 ft. or upwards a less space than 9 ft. 6 in., or if railway carriages are proposed to be run, 10 ft. 6 in. shall intervene between the curb and the rail of the tramway. The limits of a cemetery, gas, or sewage works have to be specified, and the intention to divert water into any canal or cut has also to be duly noticed, whilst, in the case of tramways, a further intimation has to be given by notices posted in conspicuous places, throughout the streets, in which it is intended to run.

During the months of October and November the engineer's attention has to be devoted to the preparation of the Parliamentary plans and sections, which, with the accompanying book of reference and *Gazette* notice, have to be duly deposited, before eight o'clock on November 30th, at the Private Bill Office, at the office of the Clerk of the Peace of the county or counties affected, and with the various parish clerks along the line of route. Often great exertions have to be made in order to get the work completed in time, and many are the stories told of the exciting rush to get country deposits in before the dreaded hour of eight o'clock strikes, but nothing is more fatal to accuracy than all night work, and many a Standing Order opposition would have been avoided had more ample time been allowed for the preparation of the necessary deposits.

And first as to the plan. The minimum scale allowed is 4 in. to the mile, but unless the whole plan is on a minimum scale of 400 ft. to the inch, enlarged plans of buildings, yards, gardens, and courts have to be added. This necessarily entails a great deal of additional work, whilst in many cases the numbers could not be placed on the general plan, but an enlargement is required. The preparation of these plans is a much easier matter now than formerly. Then the usual practice was to obtain tracings of the parish plans, reduce them all to six chains to the inch, and piece them together; where two second-class parish plans adjoined the work of patching up the junction was one requiring great care, patience, and dexterity. Now, where the Ordnance Survey is published, all is changed, and perfect plans, requiring, however, correction to date, are at the service of the engineer.

The choice will naturally lie between the plan of 6 in. to the mile, which economises much in cost of lithography, for a long line, but necessitates enlarged plans, and the parish survey of 25 in. to the mile. This latter is, in the author's opinion, the best to adopt for all suburban work, or where a large number of enlargements would be required. Larger scales even than this are sometimes adopted for metropolitan work, 88 ft. to the inch being frequently used; but where, on the other hand, enlarged plans are but seldom needed, the 6 in. scale will be the best to adopt. The plans should be prepared with the utmost care, bearing in mind the ordeal to which they will be subjected. Attention should be especially directed to see that all enclosures existing on the ground appear on the plans, that all houses are inserted, of their correct shape and size, and gates across roads, which often divide a public road from an occupation one shown. Often, too, a railway company will have a slip of land outside its thorn fence, of which no indication sometimes exists on the ground, the boundary of which should be shown by a dotted line and a separate number, but which is easily overlooked.

With regard to the rails of tramways, if the public road is referenced as "public road and tramway," it does not seem to be necessary to show them, and on the 6-in. scale it is almost impossible to do so; but when the 25-in scale is employed it may be desirable that they should be inserted.

The line of works, and how it should be marked on the plan, have now to be considered. If a railway, a full line representing the centre line will be marked throughout, with the limits of deviation shown by a dotted line on each side; there is no Standing Order to compel the words "centre line of railway" to be marked on this line, and many engineers omit it altogether; it is, however, desirable, to insert it on the first sheet, and sometimes it is written on every sheet of the plan. "Limit of deviation" should be marked on each sheet on both sides of the line. If it is desired to exclude a road or field, the dotted line of the limits must be taken close to the fence which bounds it, within the adjoining field, which is numbered and referenced. The distances must be marked in miles and furlongs from the commencement, which should be marked "Commencement of railway," and at the end of the line "Termination of railway" should be written, and the total length, in miles, furlongs, and chains, should also be added. Some engineers, however, are in the habit of omitting this latter, considering its insertion on the section a sufficient compliance with Standing Orders: indeed, the author is of opinion that no allegation could be sustained in the case of its being omitted altogether, as there is no Standing Order which requires the total length to be so written. All curves not exceeding one mile radius, must be marked with a memorandum of the length of the radius, in furlongs and chains on the plan. Some engineers mark a mile curve, as "Radius, eight furlongs," or one mile, whilst others omit it, as it is impossible to prove an allegation on this point; it is, however, desirable to insert it. The commencement and termination of the curves are now often marked, especially when the plans are drawn to a large scale; but there appears to be no obligation to insert this information. Tunnelling, if any occurs on the line, must be marked on the plan by a dotte line, the word "tunnel" should also be written along it. Covered way, however, must not be so indicated.

Diversions of roads come next in order. Any such are shown by two dotted lines, indicating the width of the road; the words "road diversion" must be written at the spot. No centre lines are needed in these cases.

We come now to junctions. Here it is requisite to show the course of the existing or authorised line of railway for 800 yards on each side of the point of junction, and a dotted line indicating the centre line is all that is required. The words, "Course of the Great Northern Railway," or whatever the line may be, must be written as well along it. All descriptions of railways should also be written in full, thus:—"London, Chatham, and Dover Railway," not, "L. C. & D. Ry." If the line joined is not the main line of the company, the name of the branch should be added, thus:—"London and South-Western Railway, Sidmouth Branch." It is not necessary to show the lines of rails of the railway with which a junction is effected.

When enlarged plans become necessary, to give details and numbers, as with a small scale general plan they often will, they should, if possible, be placed on the same sheet as the general plan. In 1863 it was decided that all the numbers must be placed on the general plan, and that they must not be referred to an enlargement. This has been reversed for some time, and the numbers may now be placed on the enlarged plan. This should be entitled, "Diagram showing Numbers" (or "Numbers and Details," as the case may be), at 5 miles 3 furlongs, or whatever else the correct mileage may be, on this enlargement, which must have a proper scale attached. "Centre line of railway" and "Limit of deviation" must be written, but the mileage and the radii of curves having been inserted on the general plan, need not be repeated. With regard to the numbering, it is not desirable to insert braces, as was formerly almost the universal custom, and is still very commonly followed, as the omission of one may lead to an allegation.

When a new road or street is to be constructed, it must be duly marked on the plan by dotted lines on the sides, and a full centre line; on this latter, "Centre line of new street," should be written, and "Line of frontage"

* By Mr. H. Michell Whitley, C.E., read at a meeting of the Civil and Mechanical Engineers' Society, on the 18th ult., Mr. R. Harkness Twigg, M.I.C.E., in the chair.

along the dotted lines at the sides. When the section refers to a datum point on the plan, this should be so marked, and the words, "Point for datum" written at the spot. County and parish boundaries have also to be shown, and the name of the county and parish duly written in their proper places.

In plans for tramway schemes, particular care must be taken to show the narrow places in the streets, if any, which had been previously alluded to in the notice. Dock, waterwork, river improvement, and other similar plans require no special mention, as the rules before mentioned are followed where they apply.

The tidal waters on one of the deposited plans (in the case where the work is situated on tidal lands) must be coloured blue, and marked "Tidal waters," for deposit at the Harbour Department, Board of Trade, and on such plans, if they include any bridge across tidal waters, the span, and headway of the nearest bridges above and below the proposed site must be marked.

Having considered the preparation of the plans, we will now proceed to examine the form in which the accompanying sections have to be furnished in order to comply with the standing orders.

The section must be drawn to the same horizontal scale as the plan, and to a vertical scale of not less than 100 ft. to an inch, but larger scales, in proportion to the scale of the plan, are generally used. The height of every embankment, and the depth of every cutting, has to be duly marked; and the datum horizontal line must be the same throughout the whole length of the work, or any branch, and must be referred to some fixed point stated in writing on the section near some part of the work, and in the case of a canal, navigation, road, or railway, near one of the termini.

In the case of a railway forming a junction with an existing line, the level of the rails at the junction is generally taken. This is, of course, not an absolute fixed point, as the level varies from time to time with the packing the sleepers, but custom has sanctioned this datum, which is generally described in the following or similar terms:—Datum line 132·27 ft. below the upper surface of rails of the Great Western Railway at the point of junction therewith marked X on the plan. Where the line is divided into two or three lines it will be sufficient to write "Datum same as railway No. 1" (or whatever the number may be) on the datum of the other lines. This was not so at one time; a separate datum point near the termination of the line itself being required, and this was a great convenience, as when a line is several miles in length, it may be requisite to check the levels through the estate of an opposing landowner, to level 40 or 50 miles from the datum point at the far end. At this point of junction, "Commencement of railway junction with Great Western Railway, level unaltered" should be written, and "line corresponding with upper surface of rails" should be inserted once at the commencement of the line.

The distances on the datum line, must be marked in miles and furlongs, to correspond with those on the centre line on the plan, whilst "Termination of railway," and the total length in miles, furlongs, and chains, must be added at the end of the line. The gradients must be marked with heights from the datum at each change, and the heights of the railway over, or depth under, roads, railways, canals, or navigable rivers, with the span and height of the arches of all bridges and viaducts marked; level crossings, if any, must also be noted, and if the level of the road is to remain unaltered, it must be so written on the section.

The extreme heights of cuttings and banks, over 5 ft., must also be written, and tunnelling duly shown, the word "Tunnel," with the length in yards, being inserted, as must also be done in the case of a viaduct, whilst the heights and depths of banks and cuttings at each end must be given in figures. At the point of junction the gradients of the line joined must be indicated for 800 yards on each side of the point of junction. This is generally done by a dotted line, there being no necessity to insert a datum line.

The mode in which the cross-sections are to be prepared is fully described in the Standing Orders, and the only point requiring attention is a recent decision, which, until it is generally known, will probably be the cause of numerous allegations. This is, that the greatest inclination of the present road is not to be taken at the steepest point, within the 200 yards on each side of the line, but between the points within which the road is to be altered. Such is the form in which sections have to be prepared for deposit, under the Standing Orders. These plans and sections have to be accompanied by a book of reference, containing the names of the owners, lessees, and occupiers, but its preparation does not fall within the province of the engineer.

The author has been thus minute in describing the form in which plans and sections are prepared, as it is of so much consequence to the engineer to see that his plans will comply with Standing Orders, and also in the hope that members will contribute, in the discussion, examples of difficult points decided by the examiners, and so aid in the compilation of a list of precedents that will be of the utmost value, especially to the young engineer called on for the first time to prepare a set of plans for some important public work which he knows will be strongly opposed.

The plans, sections, and book of reference, with *Gazette* notice, having been duly deposited, not omitting, in the case of railway Bills, the 1-inch Ordnance map with the line of railway marked thereon, which have to be deposited with the Clerk of the Peace of the county or counties, and at the Private Bill Office, the other deposits in order are,—on December 17th, a printed copy of the Bill in the office of the Clerk of the Parliaments; on December 21st, the petition for the Bill, with Bill annexed, in the Private Bill Office; on December 31st, list of owners, lessees, and occupiers, and the engineer's estimate. The form in which this latter has to be prepared is duly specified, and calls for no particular remark. It will, however, be found well worth the trouble to prepare sketches and take out the quantities of the various works proposed to be constructed, as an estimate so prepared, and based on prices for similar work, paid by the engineer, is extremely difficult to overthrow. This completes the list of documents required to be deposited, and brings us to the second stage of the subject, the procedure in Parliament.

The examiners commence their sittings on January 18th, and memorials complaining of non-compliance with the Standing Orders have to be presented before the date given in the rules issued by the examiners. If it is determined to oppose on Standing Orders, the plan, section, and book of reference are subjected to a critical scrutiny, and allegations are laid against any inaccuracy or misdescription that can be detected. Having so fully discussed the preparation of the Parliamentary plans, it is needless to dwell further on this stage of the Bill. If the examiner reports the Standing Orders are complied with, the Bill is ready for the next stage; but if otherwise, it is "sent upstairs" before the Standing Order Committee, and if it is found that the errors are not of much importance, the Standing Orders are dispensed with, but if otherwise the Bill is thrown out, which brings its career to an abrupt termination.

Assuming Standing Orders safely passed, the Bill is now read a first and second time in the House, and referred to a select committee. Sometimes, however, a Bill which needlessly interferes with great private interests, for a doubtful public advantage is thrown out on the second reading, if its opponents can muster a sufficient number of members; but this case seldom occurs.

In 1865 an attempt was made to ease the labours of committees, in shortening the time required for the investigation of the merits of a Bill, by constituting a court of referees, to inquire into "the engineering details of the undertaking, the efficiency of the works for the proposed object, and the sufficiency of the estimate," but it was found that these courts, whilst raising a cloud of technical engineering objections, which practically presented no difficulty, but yet obscured the merits of the work, doubled the labour of the inquiry, as the same questions were gone into again, under other names, before the committee, and the result being the reverse of what was anticipated. They were abolished after a few years' trial. The Bill now comes before the committee, who have had previously presented to them the petition containing the defects the petitioners allege, and in which they pray to be heard by counsel against the Bill.

Let us now suppose the case of a railway Bill, promoted to supply accommodation to a town distant a few miles from the railway system with which it is proposed to be connected, and which runs for some miles through the estate of a large landowner, and within a short distance of his residence, who has petitioned against the Bill.

The promoters open the case, and their counsel's speech and the evidence are principally directed against the allegations contained in the petition. The principal inhabitants of the town give evidence of the necessity of a railway to them, and their willingness to take shares in the line, as a proof that they believe it will pay; as many landowners as will attend to support the line state the benefit it will be to their property, and evidence is also given to prove the extent of the traffic at present existing between the two towns,—all this portion of the case being directed to prove that a public necessity exists for the construction of the railway. The engineer then gives his evidence and details his instructions he received from the preliminary committee, and the reasons which induced him to choose the line before the committee in preference to any other. The estimates he considers ample, and he has laid out the line with as little interference as possible with the estate of the petitioner, which he considers will be much enhanced in value by the construction of the line. Other engineers confirm this evidence, whilst the surveyor considers there is nothing in the petitioning landowner's case that cannot be fairly met by compensation. The money arrangements are then gone into, and the traffic manager of the railway joined called, if the line is favourable, who states what his directors will do, perhaps work the line at 50 per cent. of the receipts, and guarantee the debentures, and he will probably also state that he sees no difficulty in the way of raising the necessary capital. This will close the case for the promoters. When the opponents open their case and direct their evidence in support of their petition; in this case they would attempt to show that no public necessity existed for such an interference with private property, the traffic estimates would be questioned, evidence would be given that the promoters seriously underrate the damage that the construction of the line would do to the estate in question; that its residential enjoyment would be destroyed, or seriously impaired; that the line is laid out badly in an engineering point of view; that the estimates are totally insufficient; that no return can ever be expected on the capital expended; and that if such a railway is required, it can be so laid out as to avoid the damage to the estate of the petitioner, whilst presenting greater conveniences for the public. With these views clearly before them, the committee decide whether the preamble is proved or not; if the former, the clauses are then settled, and the Bill is through one more stage. The committee of the other House now remains to be passed, where the fight, within a somewhat narrowed limit, can again be renewed, but if successful here, the Bill passes the third reading, and then the Royal assent, when it becomes an Act of Parliament.

Such, then, are the stages through which private Bills have to pass, and it may be asked what,—if anything,—can be done to limit the time and money expended, which in very many cases amount to a most serious sum.

With regard to Standing Orders, some plan would seem to be required which, whilst insuring general accuracy, would not give rise to the interminable and tedious reiteration of trivial allegations, with which engineers have so often to do, and the formulation of a clear list of precedents given with authority is a desideratum towards this end. As to the progress of the Bill through its succeeding stages, the matter is one that is mainly in the hands of the committee itself, and it is difficult to see how an inquiry which has for its object the sanctioning or otherwise of a measure which, whilst admittedly of great public importance, interferes, perhaps necessarily, with private interests of magnitude, can be concluded without full investigation. The question is one of great interest, and the author commends it to the members of this society in the hope that some practical suggestions may be made towards shortening the time consumed in these Parliamentary inquiries.

Ventilation of Theatres.—Messrs. Robert Boyle & Son are at present applying their system of ventilation to the new Grand Theatre, which is in course of erection in Upper-street, Islington.

DECORATION OF THE DOME OF ST. PAUL'S.

SIR,—In giving you, in my former letter, my views on the subject of the decoration of St. Paul's, I did not, I find, express myself as fully and unmistakably relative to the dome as I could have wished, and as its importance demands.

Permit me now to say that I still adhere entirely to the scheme which I quoted from my paper of 1853, by which it would be divided neither by parallel circles nor meridional arcs, cutting it up into either zones or vertical segments; supported therein by the teaching of nature in the greatest of all domes,—the glorious firmament above us, wherein its nocturnal ornaments, the stars, every one of which differs from another in glory, causes the orbed expanse the more forcibly to seize on the imagination.

I am, therefore, glad to find the prominent ribs in Stevens's design meet with almost general disapprobation. It is to its consisting of one vast spherical surface, hanging over the void, expressing high human power and energy, that the dome in question is indebted for its attributes of material and moral sublimity; and this highest of all architectural qualities the vertical ribs would have the effect of destroying, and reducing it to the condition almost of a dome on an octagonal base. Undivided, it is sublime; but cut it into numerous parts by ribs, and, though still beautiful, it will be no longer sublime.

But the views I have stated lead me to question the propriety not only of the ribs in Stevens's design, but of all the architectural accessories. It appears to me that the balustrade, which must affect the integrity of the hemisphere, and the "axial thrones" are an error in the same direction, though not to the same extent, as the framework of Thornhill; and that pilasters and pediments forming thrones have no more business on the surface of the dome than pilasters and arches forming arcades; which latter would have been fatal to the grandeur of the dome but for their indistinctness, assisted by the dense atmosphere the place. The thrones with their colossal occupants, might, perhaps, in themselves have an imposing effect from beneath, but it would be at the expense of the general effect of the dome, on the surface of which they must appear as so many incisions. Viewing most carefully in imagination St. Paul's dome so treated, I cannot conceive them otherwise than as marring to its unity and simplicity.

As to the care taken by, or attributed to, Stevens to tie the dome to the drum below, that is not half so important as preserving its unity, to which no amount of sacrifice is too much. Columns or pilasters are essential to grandeur below, and the thicker set the better; but ribs corresponding to, or in recognition of them, are not essential to the dome, which, like a garment without seam, is most perfect in one piece, however it may differ, like the dome of the Pantheon at Rome, the decoration of which, such as it is, is on a right principle, from what it spans. I believe the circular frames, with their figure-subjects, are all that is necessary to relieve the surface of the dome, which should be elsewhere covered by some species of delicate Arabesque giving complete repose to the eye.

If human figures are introduced anywhere else, it should be only round the base of the dome, where there would be ample field for patriarchs, prophets, apostles, and martyrs, of about 10 ft. stature. They would have something like the effect from below of the progressive group of the Panathenaic procession from the frieze of the Parthenon. They should have no cornice, moulding, or other architectural feature separating them from the space above, which might be mistaken for the springing line of the dome; and, despite the authority of the so-oft-cited dome of the Cathedral of Parma, no backgrounds. That example seems to have been held up as a model merely because it was the work of an eminent painter, and praised by Titian, who, of course, saw it with the eye of a painter, not of an architect. I readily admit the greatness of Correggio's work, and can point with pleasure to a far higher tribute to it than Titian's. Annibale Caracci, the most distinguished of the three kinsmen of that surname, founders of the Bolognese school, writing to his cousin Ludivico from Parma, says:—"I went to see the grand cupola which you have so often commended to me, and am quite astonished. To observe so large a composition, so well contrived, and seen from below with such great exactness, and, at the same time, such judgment, such grace, and colouring of real flesh; good heavens! not Tibaldo, not Nicolini, nor Raffaelle himself, can be compared with him." Further on, after avowing that he would not exchange one of the pictures he had just seen of Correggio for the St. Cecilia of Raffaelle, he says, "I rage, I weep to think of the misfortunes of poor Antonio; so great a man, if indeed he were a man and not angel in the flesh."

No higher praise, perhaps, could be bestowed on a painter or his works. Yet it does not render the dome of the Cathedral of Parma a proper model for dome decoration. Annibale Caracci, like Titian, being only a painter, would speak of the work as a painter only, without thinking of the architecture. If it does not interfere with the unity of the dome, it interferes with its entity, for which no amount of pictorial beauty can atone; and does so, doubtless, because Correggio felt no architectural solicitude about it, and cared only for the best display of his own priceless painting; which had perhaps, however, been better represented on the frustum of a hollow lofty cone, than on a dome.

Whether it had or not a cathedral dome, though the highest heaven,—the heaven of heavens of the place,—cannot be made to represent the actual heaven of the blest, consistently with what is due to the genius of earthly architecture.

Allow me to add that it is not by any captious spirit that I have been led to make the foregoing remarks; but solely by a consideration of the more or less grievous consequences to a great national monument, that would result from any mistake in the treatment of its crowning and noblest feature. SAMUEL HUGGINS.

P.S.—Since penning the above I have read the letter of "A Painter" in the *Builder* of the 17th inst., asserting the existence of an engraving executed under the eye of Sir Christopher, containing proof that he did not greatly value the smooth uninterrupted hemisphere of the dome, which it shows relieved by panels and ribs. But that engraving shows, at the same time, that he afterwards set as little value on the panels and ribs, since he allowed them to be effaced; and, consequently, that he had no very distinct idea how the dome should be finished. It suggests, I think, the possibility of architects of the present day, with the additional light of two centuries of architectural history, attaining a truer conception of what is due to the dome than its constructor himself had reached.

That Wren, with his fondness for angular geometrical forms, and his sound judgment, approved of the noblest geometrical and architectural feature of his great work being put into masquerade, and made to wear the semblance of another inferior and complex feature, no amount of evidence seems to me sufficient.

As to Correggio, whatever he has been considered by painters, his practice at decoration ran counter to the principles of architecture; principles which guided Giotto in the decoration of his Chapel at Padua, and Michelangelo in the ceiling of the Sistine Chapel. His extraordinary mastery of *chiaroscuro* led him to give to his pictures an air of space and depth which, mocking all limitations, annihilates the architecture it is intended to adorn. S. H.

PORTLAND CEMENT CONCRETE.

MR. HENRY FAIJA, Assoc.-Mem. Inst. C.E., read an interesting paper entitled "Portland Cement and Concrete," before the members of the Southend Mechanics' Institute on Monday evening last, the 19th inst. After describing Portland cement and its manufacture, the lecturer passed on to treat of methods of cement testing, as to which he gave the following short specification to insure the delivery of a true Porland cement:—

SPECIFICATION FOR THE DELIVERY OF PORTLAND CEMENT.

1. *Fineness.*—To be such that the cement will all pass a sieve having 625 holes to the square inch, and leave only 10 per cent. of residue when sifted through a sieve having 2,500 holes to the square inch.

2. Weight per striked bushel to be not more than 116 lb., nor less than 110 lb.

3. Specific gravity to be between 3·00 and 3·05.

4. *Set.*—A pat made with the minimum quantity of water to set in not less than three hours, nor take more than six hours. The increase in temperature during setting not to be more than five degrees Fahrenheit.

5. *Tensile Strength.*—Briquettes which have been placed in water sixteen or seventeen hours after gauging, to carry at the expiration of seven days 400 lb. per square inch without fracture, and at the expiration of twenty-eight days from gauging to have increased in strength at least 25 per cent.

6. *Expansion or Contraction.*—Pats left in air or placed in water to show no cracks or other signs of deviation in form at the expiration of seven days from gauging.

7. *Colour.*—The cement to be of a cold grey colour, and when gauged to show no change if left in either air or water.

If a quicker or slower-setting cement is required, the weight and tensile strength must, of course, be varied in accordance with those requirements, and it must be borne in mind that the apparatus which is to be employed in carrying out the tests must be mentioned, otherwise difficulties may occur even though the cement may be of the required quality.

Proceeding to treat of Portland cement concrete, the lecturer observed that the production of a good, sound, and economical concrete, is dependent on the existence of a proper proportion between the large and small aggregate and the cement, in order that all interstices between the larger aggregate may be filled by the smaller aggregate and cement, so that each piece of aggregate is surrounded with cement; and as the cement is more expensive than the aggregate, no more cement should be used than is sufficient for this purpose. A concrete may thus be considered as composed of two parts, an aggregate and a matrix, the aggregate being the larger pieces which are united by the matrix composed of the cement and sand, or cement and the fine particles of the same material as the aggregate used: thus, a concrete composed of shingle would have sand added, which would be formed into a mortar or matrix uniting the shingle; while in the case of a concrete composed of a crushed stone, the matrix would be composed of the cement and the stone dust, which would unite the larger pieces of stone. The proportion of cement used to the aggregate must depend on the nature of the work for which the concrete is required, and the strength which it is desired to obtain; on the size and form of the aggregate, and on the proportion which the larger and smaller aggregate bear to each other, as well as on the nature of the aggregate used. To determine this proportion, it is usual to fill a bucket or other measure with the larger aggregate, and then fill it up with water, the quantity of water in the bucket will represent the amount of matrix necessary to make the concrete solid, the matrix being composed of the cement and fine aggregate, the proportions of which may be determined by the requirements of the case and the proportion of the fine and large aggregate, which may be ascertained in a similar manner. For many purposes of concrete laid *in situ* twelve of aggregate to one of cement is sufficient, and the Docks at Chatham have been principally formed of concrete in this proportion, with the exception of the outer face, 9 in. or 10 in. thick, which is composed of a better concrete. It seems almost impossible that such a small proportion of cement should give the desired strength, but it must be remembered that if the larger aggregate is separated from the finer, the constructive strength of the concrete is represented by certain large aggregate united by a matrix or mortar, which would be in the proportion of about five to one,—a mortar which is strong enough for almost any purpose. This example shows the economy in the use of cement over a lime concrete, for whereas a lime concrete, for a foundation, for instance, would have to be composed of at least one of lime to four of aggregate, a considerably stronger concrete would be produced with one of Portland cement to eight of aggregate, and the cost would be found to be much about the same; but as the cement concrete has a greater strength, a lesser thickness would be necessary, and consequently an economical result would be obtained.

In conclusion, the lecturer referred to the process recently patented by him for accelerating the hardening of concrete, by which concrete made in the form of paving slabs, sills, ornamental panelling, &c., can be put to its respective uses when only two or three days old.

THE CONSTRUCTION OF THEATRES.

SIR,—From an observation made by Mr. Alex. Graham, in the latter portion of his letter in the *Builder* of last week, the public might be led to conclude that the Metropolitan Board of Works have not yet framed any regulations for the construction of theatres. I should like to point out that the Board drew up a code of regulations as far back as the 2nd of May, 1879, in the exercise of the powers conferred upon them by the Metropolis Management and Building Act Amendment Act, 1878, the Act giving the Board jurisdiction over theatres. These regulations, which prescribe a minimum width for staircases, corridors, passages, &c., and generally control the construction and materials to be employed in the building of theatres, are still in force, and all theatres built since the year 1879 have been constructed in accordance with these regulations.

Recent diasters to theatres abroad having directed the attention of the authorities charged with the supervision of theatres to the necessity of revising the regulations in force for the construction of theatres, which were found in many instances to have become obsolete, fresh and more stringent regulations were framed in the course of last year by the municipalities of the principal cities of the Continent. The Board have obtained translations of these new regulations, and the question of the revision of the present regulations is now under the consideration of the Board. JOHN HEBB.

EXAMINATIONS AT THE SURVEYORS' INSTITUTION.

OF the candidates who had presented themselves for the Preliminary Examination held on the 23rd and 24th ult., the following passed the examination, and have been enrolled by the Council as Students of the Institution, viz.:—Messrs. John Arnott, Woodbridge, Suffolk; Harry Barratt, Stourbridge; Robert Alan Benson, Clifton; Walter de Hoghton Birch, Wootton-under-Edge, Gloucestershire; Herbert Wilson Buck, Worcester; Frank Wellington Carter, Salisbury; Henry Copley Clark, Dorking; Bernard Simon Dunning, Warwick-square; Sydney Newton Glass, Chiswick; William Timothy Hall, Maidstone; Sidney Pryce Harding, St. Albans, Herts; William Vincent Jull, Streatham Hill; Arthur Herbert Kerr, Crookham, Farnham; John Henry Mead, Balcombe, Hayward's Heath; Edward Mixer, Shepherd's Bush; James Pennington, Newbold-on-Avon, Rugby; Philip Edward Pilditch, Richmond, Surrey; John Baseley Selby,* Mornington-road, Regent's Park; John Henry Tiffen, Kingston-upon-Hull; James Bruce Watson, Tetsworth, Oxon; Thomas Willard, Rugby; and Percival Wraight, Anerley, S.E.

Higher examinations, qualifying for the classes of professional Associates and Fellows, will be held in the month of April next.

* Passed at the head of the list.

PROGRESS OF TELEGRAPHY.

IN the course of a lecture on this subject at the Institution of Civil Engineers on the 15th inst., the lecturer, Mr. W. H. Preece, F.R.S., said,—The growth of business since the telegraphs have been acquired by the State is enormous: 126,000 messages per week have grown to an average of 603,000; but the mileage of wire has not increased in anything like the same proportion, the excess of traffic having been provided for by the great improvements made in the working capacity of the apparatus. In 1873, the average number of messages per mile of wire was 147, it is now 256. It is in press work that the greatest increase has taken place; 5,000 words per day at the time of the companies, have grown to 934,154 words per day now. 340,966,344 words of press matter were delivered in the year ending 31st March, 1882.

The development of railways has necessitated a corresponding increase in the telegraphs required to ensure the safety of the travelling public, and while 27,000 miles of wire in England, Scotland, and Wales were used for that purpose in 1869, at the end of December, 1882, the total had increased to 69,000 miles, equipped with 15,702 instruments, against 4,423 in 1869.

The growth of business is equally discernible in the great Cable Companies. In 1871, the number of messages dealt with by the Eastern Telegraph Company was 186,000; in 1881, it was 720,000. This growth is equally striking in all civilised countries, and even in Japan, 2,223,214 messages were despatched, of which 98 per cent. were in the native tongue. The mode of transacting the trade of the world has been revolutionised, and while wars have been rendered less possible, their conduct has been expedited, and their penalties alleviated.

BIRMINGHAM ARCHITECTURAL ASSOCIATION.

ON Tuesday evening a meeting of this Association was held at the Queen's College, under the presidency of Mr. W. H. Kendrick, at which Mr. J. M. Gething, of Kidderminster, delivered a lecture on "Some Errors of Construction," illustrating the subject by a series of drawings. Messrs. Morgan, Bailey, Jones, Cleve, Mantel, Scruton, and F. Cross (hon. sec.) took part in the discussion which ensued, and supported a vote of thanks to the lecturer.

Mr. Gething considered the erection of an ordinary building, and following it, step by step, pointed out errors which had come under his observation:—*Foundations.*—Necessity for a uniformly yielding bottom, and spreading of the load; invert arches, their utility and best form; useless if they do not spread load better than the wall with its ordinary bond would do it, should be in cement because their duty commences at once. *Walls.*— Defects of incongruous materials; methods of dealing therewith considered; instances of failure; injury by plugging. *Floors.*—Trimmer arches; danger of fire. *Roof.*—Necessity of tie; disadvantage of severing the wall-plate; king-post trusts; parallelogram of forces as shown therein; the load being known, a scale made on one of the struts (extended) with which to measure the resultant strain on the king-pin, thrust at foot of principal rafter, cross strain on tie-beam, occasioned by footing the principal rafter off the wall. *Roof coverings.*—Tiles and slates; proper pitch and lap; necessity for bedding tiles, — bedding should not extend below the lap, because of retaining moisture. *Gutters.*—Lead, zinc, and iron; necessity for providing for expansion; drips in lead and zinc; sockets in iron; failures instanced,—in one of which, a wall coping, eighteen consecutive lengths were broken, by compression, at fixed standards. But out of between two and three hundred lengths not one was broken except at standards. *Beams.* — Compound and truss beams, joists a source of weakness; loss of elasticity and strength in flitch-plated beams; tension-trussed floor-beams, unfit to carry machinery because of their want of rigidity; difficulty of getting dissimilar materials to act in unison; homogeneous beams recommended. *Joiners' work.*— Necessity for allowance of shrinkage of panels, and, where exposed to damp, for expansion also; common failures and defects noticed; springing moulding into panels; difficulty of dealing with bolexion mouldings; split panels, &c.

THE TEACHING AT SCHOOLS OF ART.

THE following letter is one among others that have been addressed to the Secretary of the Royal Commission on Technical Education, and will explain itself. We shall refer to the subject in uor next:—

Sir,—In reply to your letter dated the 8th inst., making inquiries as to the influence of the existing Science and Art classes available in this district upon the industry in which I am engaged (interior decoration in its various branches), I have to state my opinion as follows:—

(1.) Although a general advance has been made during the last thirty years, both in the taste of the public demand and in the design of objects produced, there is still a lamentable want of sound technical knowledge of the principles and practice of decorative art, particularly as applied to decorative painting.

The advance made is probably due to several causes.

1. The opportunity of comparison afforded by international exhibitions, and by the increased facilities for foreign trade and travel.

2. The establishment of museums and the exhibition of collections of applied art.

3. The establishment of Science and Art classes.

4. The influence of a few earnest and enterprising artists and employers.

The weak point in the advance is, that it is not accompanied by any extended knowledge of art; nor by such a sound knowledge of style as to facilitate healthy criticism; nor, in the case of decorative painting, is it accompanied by any advance in technical facility of execution. It is almost impossible to find a student in the schools of art with any competent knowledge of how to paint ornament for interior decoration, nor have the masters and teachers themselves the knowledge requisite for instructing them. In the schools of art the masters are interested in the encouragement of those studies which secure prizes or grants. The present tendency of the departmental system is to encourage the preparation of prize-winning drawings or other works, often at great sacrifice of time. Still-life painting receives too much attention and reward. There is a general want of training in rapid freehand drawing of ornament on a large scale.

(2.) As to the means of rendering the schools of art more useful.

a. The schools should be kept more closely to their original purpose as schools of design. Less encouragement should be given to the special preparation of laboured prize-drawings, and the most valuable awards should be made on a student's collective work for the year.

b. All Departmental prizes should be such as to assist an earnest student in prosecuting his work,—not such as to encourage the vanity of *dilettanti* students.

c. The number of petty prizes should be diminished, and "local scholarships" and "travelling studentships" multiplied; the local scholarships should be attainable in the several grades; and the higher-grade prizes should be open to those students only who show proficiency in the application of art to decorative purposes.

d. It would not at once be possible, but I would look forward to the time when it should be the necessary qualification of any head master of more than 100 students that he should have taken a travelling studentship, and spent not less than three months in the study of decorative art abroad. I entertain the strongest conviction (one which is shared largely by the principal employers of art workmen in London), that the present system of work in the various schools of art connected with the department requires extensive remodelling before it can render any real help of importance to art workmen or their employers. JOHN G. CRACE.

THE PAINTING AND DECORATING TRADE AND ITS SYSTEM.

SIR,—It is quite time that the attention of the nobility and gentry should be drawn to the above, and the deceptive manner in which it is carried on in London. In an excellent article in your valuable journal you drew the attention of the public to the present system of drapers' establishments taking to the above trades; but there are other firms, such as cabinet-makers, upholsterers, and house-furnishers, who profess to be painters and decorators, and even builders, and take the work to do, at the same time knowing that they have not one man of the building trade in their employ. After they obtain the contract or order for the work, they give it, or sublet it, to what is known as a trade shop. Should there be any new building or extensive alterations, that part is let to a building firm: by the time the work is finished there have been three or four fingers in the pie, which means a very heavy percentage above the ordinary charges of a firm employing all their own labour. Two or three firms could be mentioned that take thousands of pounds' worth of work annually; and it is all given to one firm that does the work of seven or eight other spurious decorating establishments. I am quite aware that there are several old-established cabinet-makers, &c., that take the above work; but they employ all their own labour under their respective foremen, with credit to the firm; at the same time I could mention nearly a score of these wrongly-termed decorators within a radius of three miles of Oxford-circus.

The profit that these firms make by doing the work in this manner is oftentimes enormous, and with no serious outlay themselves. But my lords and dukes are told, "We keep a special staff of men for that kind of work," and it answers the purpose. I should like to see or know the firm that keeps a staff of workmen when they have no work for them to do, or that will keep more cats than will catch mice. A POOR PAINTER.

BLACKMORE PARK.

SIR,—As subscribers to your paper, we hope you will find room in your next issue to mention that the firm of Bromwich, Foster, & Co., mentioned in yours of the 17th inst., as the builders of Blackmore Park, is the same firm as Foster & Dicksee. When the Blackmore contract was undertaken the firm *was* Bromwich, Foster, & Co.; when it was finished the firm was Foster & Dicksee.

FOSTER & DICKSEE.

TABULAR STATEMENT of the STATE OF TRADE and the LABOUR MARKET, January 1st, 1883.

The following Statement has just been issued by the National Association of Master Builders of Great Britain. (Mr. W. Knox, Secretary, No. 6, Lord-street, Liverpool). Towns marked thus (*) have not made any return since July, 1882:—

	State of Trade.	In what Branch.	Supply of Labour.	In what Branch.
Aberdeen	Fair	All, except plumbers and plasterers dull	Good	In all branches, and painters abundant.
*Ashton-under-Lyne	Slack	All, except painters and plumbers, moderate	Good	All.
Alderley Edge	Quiet	All, except masons, bricklayers and joiners, slightly improved	Plentiful	All.
*Altrincham	Slack	All, except bricklayers, middling, and masons very bad	Plentiful	All.
*Beverley	Slack	All, except plumbers, middling	Plentiful	All, except plumbers, sufficient.
Birmingham	Bad	All	Abundant	All.
Bradford	Dull	All	Plentiful	All.
Bristol	Active, but	without prospect	Exceeding demand	All.
*Barnsley	Very bad	All, except painters, moderate	Plentiful	All, except painters, rather scarce.
Barrow	Slack	All	Ample	All.
*Bolton	Quiet	All	Plentiful	All.
*Blackburn	Slack	All, except painters, moderate	Good	All.
Cambridge	Unusually slack	All	Plenty	All.
*Canterbury	Bad	All	Abundant	All.
*Chatham	Dull	All	Above the demand	All.
Coventry	Very quiet	All	Abundant	All.
Cardiff	Fairly good	All	Plentiful	All.
Cirencester	Slack	All	About sufficient	All.
*Cheadle	Very quiet	All, except painters, good	Moderate	All, and masons, joiners, and plumbers plentiful.
Carlisle	Dull	All	Plentiful	All.
*Chichester	Fairly busy	All	Plentiful	All.
*Croydon	Good	All, except bricklayers, fair, and joiners very good	Good	All, except bricklayers and joiners, greater than demaud.
Cupar, Fife	Masons very dull, joiners and plumbers quiet, slaters busy, and plasterers fair	All	Above demand	All, except painters, not plentiful.
*Chorley	Bad	All	Plentiful	All.
Crewe	Improved	All	Good	All.
*Crief	Brisk	All, except painters, very dull	Sufficient	All.
Dalkeith	Very dull	All	Plenty	All.
*Darlington	Very bad	All, except painters, good	Abundant	All.
Derby	Very slack	All	Abundant	All.
Doncaster	Average	All	Plenty	All.
*Dover	Dull	All	Good	All.
*Droylsden	Masons and joiners dull, bricklayers, slaters, and plumbers, moderate, plasterers bad		Good	All, masons abundant, and joiners in excess of demand.
*Devizes	Bad	All, except plumbers and painters, moderate	Plentiful	All.
Dorchester	Very bad	All	Greatly in excess of demand	All.
*Dudley	Very quiet	All	Ample	All.
*Dundee	Painters slack	Painters plenty	Good	All.
Durham	Very dull	All	Plentiful	All.
*Dunse	Bad	All, except slaters and plumbers, good	Greater than demand	All.
*Eccles	Slack	All, except painters, moderate	Good	All.
Edinburgh	Very quiet	All	Abundant	All, except masons, fair.
Folkestone	Bad	All	Plentiful	All.
*Guildford	Very dull	All	Plentiful	All.
Gloucester	Quiet	All, except joiners, fair	Plentiful	All.
Glasgow	Dull	All, except slaters fair, and bricklayers brisk	Plentiful	All.
Greenock	Middling	All	Plentiful	All.
Galashiels	Dull	All, except painters, fair	Good	All.
*Halifax	Masons, carpenters, and plumbers, very slack		Masons, carpenters, and plumbers, good	
*Helensburgh	Dull	All, but masons and bricklayers very dull	Plentiful	All, except plumbers, moderate
*Holmfirth		Carpenters fair, masons dull, and plasterers fair	Good	Only carpenters, masons, and plasterers given.
*Hawick	Masons moderate, joiners and plasterers very slack	Painters bad, and plumbers and slaters fairly busy	Good	All.
*Hartlepools	Masons and bricklayers moderate, joiners improving, plasterers and plumbers good, painters dull		Plenty	All.
*Hartford	Slack	All	Good	All.
Hastings	Dull	All	Generally in excess of demand	All.
*Hull	Slightly improving	All, except plumbers, very quiet, & painters moderate	Plentiful	All.
Hamilton	Very slack	All	Plentiful	All.
Huddersfield	Bad	All	Good	All.
Inverness	Very slack	All	Scarce	All.
*Kidderminster	Very quiet	All	Abundant	All.
London	Very bad	All	Ample	All.
*Leicester	Exceedingly dull and quiet	All	Ample	All.
Liverpool	Quiet	All	Abundant	All.
Lancaster	Slack	All	Plentiful	All.
Lewes	Exceedingly dull	All	Plentiful	All.
Leith	Very quiet	All	Plentiful	All.
Lincoln	Depressed	All	Abundant	All.
Leeds	Bad	All, except plumbers and painters, moderate	Plentiful	All.
Macclesfield	Quiet	All	Good	All.
Manchester	Slack	All	Plentiful	All.
*Mirfield	Quiet	All	Good	All.
Montrose	Slack	All	Good	All.
Northampton	Slack	All, and masons very slack	Abundant	All.
*Northwich	Slack	All	Good	All.
*Newport	Very bad	All	Plentiful	All.
Nottingham	Good	All, plumbers very busy		Plumbers plentiful.
North Shields	Slightly improving	All	Plenty	All.
*Oxford	Slack	All	Ample	All.
Oldham	Slack	All	Plentiful	All.
Perth	Dull	All, except plumbers and joiners, fair	Ample	All.
Portsmouth	Quiet	All	Equal to demand	All.
*Pontefract	Very bad	All	Exceeds demand	All.
Preston	Moderate	All	Moderate	All.
Plymouth	Quiet	All, except plumbers, good	Ample	
*Paisley	Dull	All, bricklayers and slaters good, and joiners and plumbers fair	Plenty	All, except joiners, good.
*Radcliffe	Middling	All	Plentiful	All.
*Runcorn	Bad	All, except plumbers, middling	Plentiful	All.
Rochdale	Slack	All	Good	All.
Reading	Moderate	All	Plentiful	All.
Rugby	Dull	All	Plentiful	All.
*St. Andrews	Quiet	All, except painters, fair	Good	All, except painters and slaters, fair.
*Salisbury	Depressed	All, except carpenters, fair	Plentiful	All.
Scarborough	Bad	All	Plentiful	All.
*Staffordshire Potteries and Newcastle District	Very dull, and no prospect of revival		Masons and bricklayers plentiful, & carpenters in excess of demand	
Southampton	Little doing	All	Plentiful	
St. Helens	Moderate	All	Plentiful	All.
Shrewsbury	Fair	All	Abundant	All.
*Stirling	Dull	All, except plasterers and slaters busy	Plenty	All.
*Staleybridge	Bad	All, except plumbers and painters, fair	Plentiful	All, except plumbers and painters, moderate.
South Shields	Middling	All	Plenty	All.
Southport	Very quiet	All	Abundant	All.
*Sunderland	Fair	All, except plasterers, masons, and bricklayers, very slack, and painters good	Plentiful	All, except joiners, good, and painters fair.
Sheffifld	Very bad	All	Abundant	All.
*Taunton	Slack	All	Sufficient	All.
Wolverhampton	Very bad	All	Plentiful	All.
*Weston-super-Mare	Fair	All	Plentiful	All.
*Widnes	Very slack	All	Plentiful	All.
Walsall	Slack	All	Plentiful	All.
Wigan	Very slack	All	Plentiful	All.
Weymouth	Slack	All	Abundant	All.
*Wakefield	Slack	All	Plentiful	All.
Winchester	Not stated	Not stated	Plentiful	All.
Warrington	Moderate	All, except masons slack, and bricklayers and joiners fair	Plentiful	All.
*Worcester	Slack	All	Plentiful	All.
*Whitehaven	Bad	All	Good	All.
West Bromwich	Slack	All	Plentiful	All.
York	Slack	All	Plentiful	All, except slaters, scarce.

Notice of Alteration in the Rate of Wages and Hours of Labour.—Birmingham.—The bricklayers demand advance of ½d. per hour, and sundry alterations in working rules, including notice of abolition of arbitration. The bricklayers' labourers demand an advance of ½d. per hour, and joiners an advance of ½d. per hour, and sundry alterations in working rules, including notice of abolition of arbitration. The plasterers demand an advance of ½d. per hour, and alteration in working rules. The employers have replied by handing back existing rules as counter-notice.

THE SANITATION OF RUSSIAN TOWNS.

THE question of sanitation, so important to the densely populated cities of the West of Europe, was not, up to quite recently, one concerning which even large Russian cities troubled themselves much. Russian towns, as a rule, are straggling, and cover a large area. The houses are mostly one or at most two stories high, and a large yard being attached to each house, they are built at some distance from each other. The streets are very broad; in the very centre of towns there were (and in the smaller towns there are up to the present day) large uncultivated and unused spaces. With the exception of St. Petersburg, Moscow, Odessa, Kieff, and a few others, up to within quite recent years even the larger cities had neither pavement nor a water supply. Even in the cities mentioned (excepting, again, Odessa, which may be called a pattern Russian town, as far as order is concerned) the state of the paving and the supply of water are not at all satisfactory. All this explains sufficiently why the subject of sanitation was, until lately, a matter unknown in Russian towns.

The question became a burning one first for St. Petersburg, built, it is well known, on a vast morass, the statistics of mortality of which are so abnormal that, were it not for the continuous immigration from the provinces, it would long ago have been a deserted city. After a great portion of the town had been supplied with Neva water, and the use of water-closets had become general, the evils attaching to the traditional night-soil wells became more striking. While subterranean wooden or stone channels exist for carrying off surface water into the Neva, the night-soil accumulated in the wells is daily moved out of the city in barrels, and deposited outside its boundary. The level nature of the ground on which the capital is built and the high level of the underground water present very great difficulties, and point to the pneumatic system as the only true solution. An experimental station was, with this view, erected on Semyonoff-square, and trials were made on M. Liernur's plan, in the first place, with the barracks there. The results were very satisfactory; but, although the system tried found much favour, the authorities do not appear to be in a hurry to apply it to the whole of St. Petersburg, on the ground, seemingly, that it has given rise to much complaint in some small Dutch towns. Another sanitary engineer, M. Bouroff, is also experimenting in St. Petersburg with a pneumatic system, differing from that of Liernur only in detail. Thus he does not connect the street sewers direct with the closets, but with the night-soil wells. He also employs a steam aspirator, for creating a vacuum, &c.; but nothing definite has as yet resulted from his experiments. The question is consequently still in the experimental and controversial stage at St. Petersburg.

Moscow has made greater progress in this respect. There it was at once recognised that the flushing system was the most practicable. Preliminary inquiries have been made in detail, and the city authorities are even said to be in possession of a plan prepared by Baurath Hobrecht, of Berlin. But its execution does not seem to progress very quickly, for Prince Dolgoroukou, the governor-general, has requested the central government to take charge of the important question of a sewerage system for Moscow, and to appoint a commission consisting of representatives of the city, the county (*zemstvo*), the government, and technical societies.

Odessa, which enjoys the reputation of being the best paved city in the whole of Russia, and which possesses a capital water supply, is also the best drained city. Its sewers are constructed on the flushing principle, but it is a cause for regret that the system does not comprise the whole of the city, the outer parts of the town not being included in the network of canals. The fact is, the system is not obligatory, each house-owner being free to adhere to it or to continue in his house the old abominable plan of cesspools; in the former case, however, he has to subscribe to certain conditions of a technical nature. But all the good that is effected by the excellent sewerage of Odessa is almost rendered nugatory by the circumstance, that the outfall of the main sewer is in the middle of the harbour, close to the public bathing establishments!

In the oldest of Russian cities,—venerable Kieff,—serious attention was first drawn to the question of canalisation a few years ago, when it was found from the death-rate statistics of the town (which is situated in a most charming position on the high hills bordering the river Dnjepr, here both wide and rapid in its course) that the rate of mortality was unusually high,—over 38 per 1,000 in a population of nearly 200,000 souls. A commission, consisting of engineers and physicians, was appointed by the municipality in 1879, who submitted an exhaustive report, in which they embodied the following resolutions:—(1) That the sanitary condition of the city was one full of apprehension. (2) That the cause of this state of things must be sought in the pollution of the soil and the underground water by night-soil wells. (3) That a flushing system is the best mode of cleansing the hilly town of Kieff, although the preparation of irrigation areas would cause difficulties. (4) That the annual outlay for keeping the sewers in order, and for interest and amortisation, would be less than the present cost of removal. (5) That a separate network of sewers is to be constructed for carrying off surface water, but only in the principal streets. (6) That the question of expense could be solved correctly only after the completion of the preliminary works, but that it might be stated that the total cost would not be more than 2½ million roubles (15 to 20 roubles per head of the population).

The town council agreed to this report of the special commission, and ordered preliminary works to be commenced. During last summer those works, of a topographical, geological, and statistical nature, were actively prosecuted; and at the present time plans and tables are being prepared with a view of drawing up the final project. Thus the matter of sewerage is in a fair way of being settled at Kieff. There is, however, a law in Russia which forbids the pollution of public water-courses. Now, the municipality of Kieff is on the point of asking permission for carrying the sewage of the town to a certain distance below it, and there construct an outfall into the Dnjepr. If it is considered that this river has a velocity of 0·75 mètre with a volume of water of over 200 cubic mètres per second, and that its riparian population is very thinly scattered, it is thought that such a proposal will carry no hidden danger. On the other hand, the preparation of irrigation areas, available only far from the city and at a height of nearly 80 mètres above the collecting basin, would increase the expense to such an extent that it may well be said that the next phase of the canalisation of Kieff depends upon the decision of the Government, in regard to which it may be said that a similar consent was given in the case of Warsaw.

In that city the works for a system of sewerage by flushing, with an outfall into the Vistula, are in course of execution, after plans by Mr. Lindley. At Warsaw, as elsewhere, the subject gave rise to much discussion, and it remains yet to be seen whether the solution of the question by an outfall into the river is the correct one. Grave doubts are entertained on that point, but, at any rate, Warsaw will soon have a rational system of sewerage in operation, and defects, should there be any, will probably be satisfactorily remedied.

The question of sanitation has been mooted in several other smaller Russian towns,—at Charkoff, for instance, and elsewhere; but it has not yet emerged from the stage of municipal discussion. But there is no doubt that the public interest has been aroused, and a number of engineers are working hard to keep it alive, to extend it, and to cause it to bear practical results. Lectures on the sanitation of towns are being delivered in scientific circles; the organs of learned societies are full of papers on the subject, which are partly reprinted in popular form in the daily journals; and everything is being done to promote a movement upon which depend the health and well-being of the populations of Russian towns.

We are indebted for the above particulars to a valued German contemporary, the *Gesundheits Ingenieur*.

Hygienic Dress.—An exhibition of hygienic dress, decoration, and sanitary domestic appliances, under the auspices of the National Health Society, is to be held in June next, in the Knightsbridge Hall. Miss Lankester, of 44, Berners-street, will give any information desired.

BUILDING PATENT RECORD.*

APPLICATIONS FOR LETTERS PATENT.

705. W. Russell, Pendleton. Kitchen ranges and stoves. Feb. 9, 1883.

712. G. Ermen, Holcombe. Fireplaces, stoves, and grates. Feb. 9, 1883.

714. S. Deards, Harlow. Apparatus for warming houses. Feb. 9, 1883.

753. J. H. Johnson, London. Machinery for sawing, polishing, &c., stone marble, &c. (Com. by G. Westinghouse, Pittsburg, U.S.A.) Feb. 10, 1883.

762. A. Codd, London. Prevention of water waste and flushing cistern. Feb. 12, 1883.

803. W. Mullett, Brierley Hill. Construction of walls for buildings to prevent damp. Feb. 14, 1883.

812. H. Thompson, London. Domestic stoves and grates. Feb. 14, 1883.

826. W. Blakely, Bournemouth. Preventing the radiation of heat through the roofs of houses, &c. Feb. 14, 1883.

NOTICES TO PROCEED

have been given by the following applicants on the dates named:—

Feb. 13, 1883.

4,980. H. McRuer, Glasgow. Cooking-ranges. Oct. 19, 1882.

5,124. A. W. L. Reddie, London. Alarm-bells for doors, &c. (Com. by E. J. Masseron, Paris.) Oct. 27, 1882.

5,301. R. G. Hodgetts, Birmingham. Manufacture and ornamentation of metallic furniture. Nov. 6, 1882.

Feb. 16, 1883.

4,875. E. Guattari, London. Preventing the surreptitious opening of doors and windows. Oct. 13, 1882.

ABRIDGMENTS OF SPECIFICATIONS.

***Published during the Week ending** February* 17, 1883.

2,973. R. Boyle, London. Ventilators for buildings, &c. June 22, 1882. Price 6d.

This consists of various arrangements of the deflectors in ventilators.

3,000. G. Dawson and C. Butcher, Thorncliffe. Kitchen ranges. June 24, 1882. Price 6d.

This consists in making these ranges self-contained and independent of any brickwork, and allowing air to pass through the furnace-door to circulate round the oven, &c.

3,034. F. A. Bonnefin, London. Receiving and collecting excrementitious and other foul and waste solid and liquid matter in houses, &c. June 27, 1882. Price 6d.

The solid and liquid matters are divided from one another, and collected and separated in a receiver in the bottom of the house.

3,096. H. Conolly, London. Water-waste preventers. June 30, 1882. Price 6d.

The cistern is fitted with a syphon consisting of the discharge-pipe rising up through the bottom of the cistern, covered with a cap which forms the short leg. The top of the cap is enlarged by a shoulder which prevents the water falling back noisily into the cistern when the flush is ended, and a small pipe descends from this shoulder to allow air to enter the syphon when the flush is nearly ended, and gradually to finish the same. The displacer is a floating body formed round a tube rising up in the cistern, and the pull passes through the bottom of the cistern up through this tube, and is connected to the top of the displacer. When the displacer is pulled down into the water the syphonic action is established. The supply-pipe is led to the bottom of the cistern to obviate any noise from the inrush of water.

3,110. J. Brownrigg, Windermere. Door furniture. July 1, 1882. Price 4d.

A spring washer is passed over the spindle on to the adjusting nut, and the knob is screwed up tight against it.

3,116. E. V. Emery, London. Venetian blinds. July 1, 1882. Price 2d.

The cords pass through pieces of indiarubber attached to the laths, so that when the cords are pulled the latter are lifted, and collect at the top instead of at the bottom of the blind. (*Pro. Pro.*)

3,127. G. Hodson, Loughborough. Manufacturer of artificial stone or concrete. July 3, 1882. Price 2d.

The stone is made with Portland cement coloured by natural oxide of iron. (*Pro. Pro.*)

3,145. C. Priestland, Birmingham. Rack-pulleys for blind-cords. July 4, 1882. Price 6d.

The rack-teeth are cut in the sides of the carrier slides in which the tooth of the pulley-frame engages.

3,168. M. Kellow, Merioneth. Cutting and dressing stone. July 5, 1882. Price 2d.

The cutters are square bars of steel mounted on a disc which is rotated. (*Pro. Pro.*)

---

* Compiled by Hart & Co., Patent Agents, 186, Fleet-street.

3,191. W. C. Gibson, Newcastle. Manufacture of bricks, &c. July 6, 1882. Price 2d.

The bricks are coated with glaze in their damp state and then pressed. (*Pro. Pro.*)

3,316. W. R. Lake, London. Conduits for gas and water, &c. (Com. by A. Kerandt, Essen, Germany.) July 12, 1882. Price 2d.

These are made of corrugated metal tubes or cylinders.

5,197. W. R. Lake, London. Apparatus for flushing water-closets, &c. (Com. by J. Cooper, Boston, U.S.A.) Oct. 31, 1882. Price 4d.

The tank is divided into two parts by a horizontal partition. A double-faced valve fits the seats on the partition, and on the bottom of the tank. When this is lifted it allows the water in the lower part to flow down to the closet, and when the valve is released it is checked in its descent by the air in an annular cylinder surrounding the discharge-pipe from which the air is only allowed to pass out very slowly. The water from the upper part of the tank, therefore, also passes down the discharge-pipe.

A CONCRETE VAULT FOR HEAVY LOADS.

THE drain of a manufactory at Gernsbach (Baden) has just been covered in with a vault constructed of concrete, of unusual dimensions, and intended to bear a very heavy load. According to the *Deutsche Bauzeitung*, the vault is 184 ft. long, in the form of a three-centred arch of a span of 24 ft., has a rise of 8 ft., and a thickness in the crown of 1 ft. 10 in. In the spring of the arch, an upper as well as a lower boarding was employed in making it. The vault was constructed in lengths of 15 ft. The concrete was stamped in as nearly as possible in the radial direction of the arch. The mixture used consisted of one part of Portland cement, five parts of broken granite, and two parts of clean sharp quartz sand. The cost was about 21s. per cubic yard. For the abutments and the inclosure walls, another mixture was employed, which consisted of one part of cement, seven parts of broken granite, and two parts of quartz sand, and cost 15s. per cubic yard. Upon the face of the arch rises the facing wall of the building erected on it, which, including the roof, represents a weight of 42 tons. The vault is loaded, further, by a steam boiler and a soda boiler to the extent of nearly 2 tons per square yard of surface.

THE NEW TECHNICAL COLLEGE AT FINSBURY.

THE New Technical College which has been erected by the City and Guilds of London Institute in Tabernacle-row, City-road, was opened on Monday last, when Mr. Philip Magnus delivered the inaugural lecture. The building is of brick and stone, solidly and practically designed by the architect, Mr. E. N. Clifton, who built the Cowper-street Schools, in the rear of the college, which have served for some time past as a temporary habitation for the large and increasing body of students. In special details the architect has been assisted by the suggestions of the director of the Institute and present principal of the college, Mr. Philip Magnus, and the professors at the head of the various departments. One of the rooms set aside for delicate physical experiments is worthy of remark as being fitted with isolated tables or piers rising through holes in the floor, from which and the rest of the building they are entirely disconnected, with the object of avoiding any disturbance to which the general edifice may be subjected. This room is situated on the ground floor, which is divided into numerous large rooms for various departments of physics, for the making and alteration of apparatus, for drawing of various kinds, and so forth. Most of the rooms have plain granitic brick walls, without plaster or ornament of any kind to distract the attention from study. In the so-called brewing-room, the room for metallurgical work, and other apartments of the basement, the walls are lined with white enamelled brick, for the double reason that the surface resists humidity and reflects instead of absorbing light. The basement is fitted with the gas and steam engines, boilers, and furnaces necessary for the lighting, warming, ventilation, and general service of the building, all this machinery being arranged in ample space, so that students may be instructed in its management and taught to draw and thoroughly understand its various parts. The lighting of the building will be divided between the Siemens' gas and the electric light on the Edison system. The upper floors are devoted to class-rooms, lecture-rooms, each capable of holding 200 students, and to the great chemical laboratory already described. The amount of labour required to plan and construct a building for the special purposes already enumerated can hardly be over-estimated; yet the work has not only been done well but quickly. It is not two years since the building of the college was finally decided upon, and only a year and three-quarters since the Duke of Albany laid the foundation-stone. We may have more to say about the building on a future occasion.

Mr. Magnus, in the course of the opening lecture, before mentioned, said that the majority of people took a very narrow view of the extension of technical education, while others were unable to understand the different kinds of training to which it was applicable. He proposed to call that training, education, or instruction, technical which had direct reference to the career of the student who received it, whether he were engineer, weaver, manufacturing chemist, or cabinetmaker. If he were asked to state in a word what had given rise to the necessity for technical education in the narrower signification of the term, he should answer, the invention of the steam-engine, as it was to that primarily that we owed production on a large scale, which, in its turn, had lead to the breaking-up of the apprenticeship system, thus necessitating some other kind of training. In the development of this scheme of technical education, every improvement made in elementary and intermediate instruction would facilitate the work, and he thought one important step would be to have drawing better taught to the children in primary schools; while in Manchester a good example had been set by the children being practically instructed in the use of ordinary tools in woodwork. The college would consist really of a day-school which would fit the student for engineering or the workshop, and an evening-school, which was intended to help those already engaged in the various industries in understanding the processes underlying their daily work. It would also receive pupils from the middle schools, and while the majority of them would complete their education there, the others would be enabled to proceed by means of scholarships to the central school at South Kensington. It was not to be a school where any actual trade would be taught, but a means by which workmen might supplement their education and their knowledge of the work in which they were engaged. Every pupil on entering would declare to what industry he wished to apply himself, and then he would find a course of instruction drawn out for him on the indicated lines.

HOUSE DECORATORS' CLUB AND INSTITUTE COMPANY.

THE second annual general meeting of this company was held on Thursday evening, the 15th inst., in the large billiard-room of the club, 19, Howland-street, Tottenham-court-road, the necessary alterations to the general meeting-room not having been completed; plans for these alterations have been generously given by Mr. Lewis P. Crace, of Wigmore-street.

The report, showing that the club had been opened since January 1st, and that no liabilities had been incurred up to the date of report but what were doubly covered by the calls on shareholders now being made, and that their success was largely due to the aid given by the trustees, Messrs. J. G. Crace and J. H. Donaldson, was, after some discussion, adopted, the directors explaining that the high salary now paid to the secretary was to be only during the organisation of the club. The secretary, treasurer, and auditors were then re-elected; a sum of 30s. being voted to the last-named for their services.

The board of directors was reduced to twelve, three of the retiring directors and others being elected to complete that number. A hearty vote of thanks was given to the directors, they refusing any remuneration for their services.

The Chairman (Mr. J. H. Donaldson), replying to the usual vote of thanks, said he was very pleased to have met them in their own place, and he had additional hope for their ultimate success from the careful manner in which they had discussed their balance-sheet that evening. He was very deeply interested in the welfare of the working-man, as, with a large number of them his own interests were at all times bound up. He would endeavour to secure for them the services of gentlemen of ability to deliver lectures on matters connected with their trade, and meanwhile would call special attention to the very interesting lectures on the history of ornament about to be delivered by Dr. Zerffi at the Painters' Hall, under the auspices of the Painters' Company. He has ventured that day to send them a number of book as the nucleus of a library, and he would promise to follow this up by sending works of a technical character selected with a view to place within reach of all the members the best obtainable information relating to their trade.

After the meeting the members visited the reading-room to see the books referred to,—a goodly array of thirty-one volumes of the works of Dickens, together with the poems of Scott and Hood. The poems of Burns have already been presented by a member, while over the chimney-piece is a neatly-framed illustration from the *Builder* of the staircase at Mercers' Hall, given by one of the members engaged on the work there.

The Phœnix Society and the Society of United Brothers, two of the very oldest benefit societies connected with the trade, now hold their weekly meetings at the club.

The co-operation of employers or operative decorators is invited either by taking up shares or becoming members of the club.

SMOKE AND WESTMINSTER ABBEY.

SIR,—The Council of the Smoke Abatement Institute have forwarded a memorial to the Home Secretary, requesting him to urge upon the magistrates the necessity of using to the full the powers they possess of inflicting fines and repeated penalties on offending manufacturers, who are responsible for the rapid decay of the stone of such buildings as the Abbey, Lambeth Palace, and the Houses of Parliament. If Sir W. V. Harcourt and his ædiles will enforce the prayer of the petitioners, it is certain that a clearer atmosphere will result. But what then? Will not the *invisible* gases which are known to result from coal combustion, salt glazing of pottery, gas-making, and numerous other operations, be more destructive than ever to buildings constructed of calcareous stone? It is true that the memorialists mention noxious vapours from workshop furnaces as well as smoke, but, as far as I am aware, they have hitherto confined their most laudable efforts solely to the complete combustion of coal. To the general public this would, doubtless, appear an all-sufficient boon. The Duke of Westminster, Mr. Hart, Lord Algernon Percy, and the other memorialists, however, refer to the rapid destruction of the public buildings by these powerful gases,—hydrochloric, carburetted hydrogen, sulphuric, ammonia; and if they are to be protected from further injury, I apprehend that special means beyond the perfect combustion of fuel are necessary.

The unconsumed carbon deposited on our public edifices, though very injurious to their architectural effect, and very offensive to the eye, is a comparatively innocent offender in destroying them. The gases I have referred to are the real culprits. When Dr. McCormack in 1872 analysed an old piece of stone from Lambeth Palace, it was hydrochloric acid,—an invisible enemy,—that he discovered some inches below the surface, and to that extent the cementing ingredients had been entirely destroyed. Analysis would show the same result with stone from the Palace and Abbey in Westminster, and all other buildings of calcareous stone.

There can be little doubt as to the possibility of destroying these invisible enemies to the architect and his works, but I fear that if Mr. Hart and his friends should clear the London atmosphere of smoke they will, naturally enough, feel that they have completed their difficult task; but then our freestone buildings will still go on decaying.

As, therefore, under the most favourable circumstances, it must be years before the London atmosphere will be restored to something like its normal purity, I venture to invite the rising generation of architects to turn their attention to the use of materials of known durability in London and of an appropriate pre-Renaissance style, the characteristic of which must be colour as opposed to carving and moulding, and of which Italy and the East furnish numerous examples. The materials I refer to lie, so to speak, at our very doors, and indeed are occasionally used for special architectural effect. If these red, white, and grey granite, porphyries, green serpentines, and black basalts were applied in construction in a manner similar to ornamental brickwork instead of the present Greco-monolithic method of using them, an architectural style, not only novel but of everlasting durability, and without extra cost when compared with carved and moulded stone work

would be the result. The importance of some such movement as I venture to recommend is strongly enforced by the statement of the Chief Commissioner of Public Works, Mr. Shaw-Lefevre, that 2,500*l.* are annually spent in repairing the stone of the Houses of Parliament.

HENRY TRAVIS.

AN APPEAL TO THE BENEVOLENT.

SIR,—Knowing how widely your paper is circulated among those who know only too well the dangers attendant upon sewer work, will you kindly allow me, through the medium of your columns, to appeal to the sympathy and generosity of the benevolent public of a wider sphere than our own immediate neighbourhood for assistance towards the relief of the widow and fatherless children of the late William Young, who met with an untimely death on the 6th inst. by a quantity of earth falling upon him when working in a sewer heading.

He had been in the service of the Folkestone Corporation for many years, and was highly respected both by his employers and fellow-workmen. He was a temperate, industrious, energetic, and skilful workman, ever ready to lend a helping hand (especially in cases of emergency), and indefatigable in his services as a fireman.

His awfully sudden death is, I am sorry to have to state, not the only cause which awakens our sympathy; the poor fellow went home to his tea at five o'clock, when he found his wife had been confined in the afternoon; he returned to his work, and shortly after six p.m. was a corpse, thus leaving a widow with seven children totally unprovided for. She naturally will not be able for some little time to contribute anything towards their maintenance, but I feel sure, she being a hardworking woman, will, with the assistance of kind friends, fill the place of the deceased towards her children.

His Worship, the Mayor of Folkestone (Mr. J. Sherwood, 3, Sandgate-road), and the Rev. R. Foster Jeffrey, 25, Brockman-road, have kindly offered to receive subscriptions, and which I most earnestly solicit on behalf of the widow and orphans.

They will also be thankfully received by me, at my Office, Dover-road, and duly acknowledged in the public press.

A. W. CONQUEST, *Borough Engineer.*

Folkestone.

BOOK-KEEPING COMPETITION.

SIR,—In consequence of a notice in your paper of a prize to be offered by the Royal Agricultural Society of England, I sent in a plan of book-keeping suitable for farm accounts.

I now enclose the circular of the judges, who have found that none of the plans were good or simple enough to meet the requirements of the ordinary farmer.

May I be allowed to point out that the failure in this, as in so many competitions, arises from the want of distinct regulations or information as to the actual requirements of the case?

You will observe that there are but two short heads, and having got the plans, the judges then proceed to lay down two more rules which should have appeared at first, viz.:—

3. That the accounts be adapted to a mixed farm of 200 to 300 acres.

4. That they be on the columnar system.

I venture to suggest that if they will offer another prize with these additions they will meet with success.

ACCOUNTANT.

GAS *v.* VEGETATION.

SIR,—Mr. Killingworth Hedges, C.E., appears to have forgotten that there are a large number of gas-heating and cooking stoves, &c., and many hundreds of gas-burners alight daily in the Crystal Palace, besides the suspending lamps used for lighting the south nave, &c.; in fact, there is sufficient gas consumed in the building daily to properly light many such buildings. I do not agree with Mr. Hedges's remarks respecting cheapened gas-lighting; they may be correct as far as regenerative burners are concerned, but these are mostly used for street-lighting. If Mr. Hedges will test them he will, I think, find that an improved flat-flame burner does not produce so much heat as the old fish-tail burner, althongh it gives much more light with the same amount of gas.

ARTHUR CLARKE.

CHURCH-BUILDING NEWS.

Balsall Heath.—The church of St. Thomas-in-the-Moors, Cox-street West, Balsall Heath, has been opened for Divine worship, but its consecration by the Bishop of Worcester has been deferred until the building has been enlarged and an ecclesiastical parish constituted. The church was built out of funds bequeathed for the purpose by the eminent surgeon, the late Mr. Sands Cox. The foundation-stone was laid about fifteen years ago, but little progress was made until two or three years afterwards, when Mr. Sands Cox died, and left the sum of 3,000*l.* to complete the church, provide a memorial east window, and form an endowment for the future incumbent. When the church was built, grave difficulties at once presented themselves, arising out of the fact that Mr. Sands Cox had executed two trusts, one relating to the site and the other to the patronage. As the former trust included the church, it was found necessary to amalgamate the trusts, and in order to do this, application had to be made to the courts of law. A considerable time elapsed before sanction was obtained for placing the patronage of the fabric in the hands of the same trustees, but eventually this object was accomplished. At present the building, which is a plain brick structure, only consists of the nave and aisles, with a small chancel and vestry, and the accommodation is very limited. It is proposed to extend the nave and chancel, and, if space allows, to add transepts and an organ-chamber. Increased accommodation will be provided for 200 more worshippers. About 1,000*l.* is the sum required to enlarge the church, and it is expected that it will be finished by Midsummer.

Plymouth.—A parclose screen has just been added to the internal fittings of St. Peter's Church, Plymouth. It stands upon the south side, and fills the whole of the eastern bay of that arcade. The extreme height of the screen is 23 ft., and its width 15 ft. The lower portions,—that is, the columns and carved capitals which surmount them,—are of red Corsehill (Scotch) stone, whilst the dwarf wall below them, and all the rich tracery work above, are of Bath stone. The style of work is, of course, of the "early" type which pervades the whole building. The screen, like the alabaster and metal rood-screen recently erected, is the handiwork of Mr. Harry Hems, of Exeter. A third screen is in Mr. Hems's hands, and will be fixed after Easter immediately in front of the organ. It is of similar character to the one just finished. These screens have been carried out from the designs and under the personal supervision of Mr. George H. Fellowes Prynne, architect, London.

Miscellanea.

New Harbour Works at Genoa.—The defective harbour accommodation of Genoa has long been a subject of complaint. To meet this want most extensive works are in course of execution. At present the quays of Genoa Harbour are only 26 ft. wide, and its moles narrow, so that vessels are compelled to unload into smaller lighters in the open roadsteads. It is proposed to construct six new moles, each 660 ft. long and 330 ft. wide, and to widen the quays to 495 ft. Large warehouses are to be erected on the quays, and connected by a branch railway with the central terminus of Genoa at San Pier d'Arena. The estimated cost is 1,560,000*l.*, 800,000*l.* of which are covered by a legacy left by the late Duke of Galliera. The works are expected to be completed by 1888. The need for enlarged harbour accommodation for Genoa will be understood when it is stated that in 1880 the tonnage which entered the port was 1,200,000 tons.

The International Electric Exhibition, Vienna, 1883.—His Imperial Majesty the Emperor Francis Josephus has been pleased to order the artistical establishment of Carl Giani to produce a pavilion for the electric exhibition. This pavilion is, according to the intentions of his Imperial Majesty, for the purpose of demonstrating the effects of electric light on richly-worked draperies and embroideries. According to the plans, already in progress, this pavilion, for which the exhibition is entirely indebted to the munificence of his Majesty, will be of considerable dimensions, and carried out in a pure architectonic style well suited for the purpose, and richly decorated with precious stuffs. It will be arranged for the alternate application of different systems of electric light in order to show their relative effects.

A New Hospital for Darlington.—A will be remembered by some of our readers, we called attention some three years or so ago to the unsatisfactory state of the present building, and we have now much pleasure in stating that a new hospital is to be erected forthwith. At a largely-attended meeting of the committee, held on the 16th inst., it was moved and seconded that local architects be invited to submit designs in competition. The motion was, however, lost, and Mr. G. G. Hoskins was appointed architect for the new building.

The Bedford Park Estate.—Mr. J. Donkin writes from the Bedford Park Estate Office, Chiswick, to correct a statement of *The Medical Press*, to which we gave publicity last week under the head of "Builders' Eccentricities." He says the statement that the larders are invariably next water-closets, and that in the majority of cases the doors opening into the injecta and ejecta respectively are directly contiguous, is untrue. In no single instance that he knows of are the doors of such places planned contiguous or near each other.

School Board Schools in Glasgow.—New Board Schools in Dennistoun and John-street, Bridgeton, in the east end of Glasgow, were opened on the 10th inst. by the Right Hon. Lord Young. From a statement made at the meeting by Mr. Fife, convener of the Property Committee, we learn that the site for John-street School extends to 3,989 square yards, the whole of which is available for building. Mr. William Landless, architect, by the plans prepared has utilised the ground as follows, namely:—School buildings, 1,012 square yards; playground and offices, 2,977 square yards—total, 3,989 square yards. The total accommodation provided is for 1,149 scholars, allowing 8 square feet for infants and 10 square feet for the older scholars. This school and the one at Dennistoun are the first schools that have been built in the city according to the most recent requirements of the Scotch Education Department. The plans were transmitted to the Scotch Education Department on the 1st February, 1881, and returned, along with the specifications approved of, on May 15, 1881. Offers for the principal artificers' work were accepted on June 17, 1881, viz.:—1, Mason work (Mr. Alex. Muir), 4,599*l.*; 2, joiner work (Messrs. Macaulay & M'Gibbon), 2,640*l.*; and other trades bring up the total to 9,561*l.* 3s. 5½d. Mr. Landless, architect, has added to this amount—for furniture, architect's fees, &c., the sum of 1,200*l.* The cost of the buildings will be equal to 9*l.* 7s. 7¾d. per scholar. The site for the school cost, including legal expenses, the sum of 7,047*l.* 9s. 11d. The total cost of the site and buildings is 17,808*l.* 13s. 4½d., which is equal to 15*l.* 9s. 11¾d. per scholar. The site for Dennistoun School extends to 4,529 square yards, of which 3,300 are building ground. Messrs. James Salmon & Son, architects, by the plans prepared have utilised the building ground as follows, namely:—School buildings, 1,000 square yards; playground and offices, 2,300 square yards—total, 3,300 square yards. The total accommodation provided is for 1,050 scholars—allowing 8 square feet for infants and 10 square feet for the older scholars. As already stated, this school, and the one at John-street, Bridgeton, are the first schools that have been built in the city according to the most recent requirements of the Scotch Education Department. The plans were transmitted to the Scotch Education Department on May 19, 1881, and returned, along with the specifications approved of, on June 11, 1881. Offers for the principal artificers' work were accepted on September 26, 1881, namely:—Mason and brickwork (Parker & Dick), 3,372*l.*; wright work (William Lightbody), 2,468*l.* 10s. 3d.; and other trades bring up the total to 8,391*l.* 8s. 0¾d. Messrs. James Salmon & Son have added to this amount for furniture, architects' fees, &c., the sum of 1,901*l.* 6s. The cost of buildings will be equal to 9*l.* 16s. 0¼d. per scholar. The site for the school cost, including legal expenses, the sum of 3,888*l.* 14s. 3d. The total cost of the site and buildings is 14,181*l.* 8s. 3¾d., which is equal to 13*l.* 10s. 1¼d. per scholar.

Slaughter House Reform.—At the usual monthly meeting of the Sanitary and Economic Supply Association, held on the 17th inst., in the School of Science, Gloucester, the Bishop of Gloucester and Bristol in the chair, after a discussion on the above subject, introduced by Dr. Wright, F.R.S., Medical Officer of Health for Cheltenham, the following resolution, proposed by Dr. Bond and seconded by Mr. S. Bowly, was unanimously adopted: "That this meeting desires to express its warm approval of the principle of public slaughter-houses as conducive to the interests of economy, health, and humanity; and its earnest hope that the local authorities of this neighbourhood will, with as little delay as possible, take such steps as may be in their power to provide for this most pressing want."

Chandler's Patent Supply Cistern.—Our advertisement columns give a representation of a supply cistern for kitchen-range boilers, which is of a neat design, besides possessing several improvements over the old-fashioned square cistern. For example, the old-fashioned cistern possesses no facilities for fixing, but requires either a brick pier to be set on, or a niche in the brickwork, whereas this cistern has four lugs by which it can be fixed with screws or nails, and being of a neat appearance it can be placed in sight. It is fitted with ball-valve, connecting-screw, and union complete, and deserves to be looked at.

Sunday Schools, King's-Lynn.—On Tuesday last, a bazaar was opened at the Athenæum King's Lynn, Norfolk, in aid of funds for building the Wesleyan Sunday Schools. The buildings are approaching completion and the accommodation will consist of lecture-hall, 60 ft. by 40 ft. and 26 ft. high, with panelled boarded wagon-roof. The room will be lighted by three large windows with traceried heads; the artificial light will be supplied by a sunburner, and by brackets at the sides. Five class-rooms are provided, opening directly into lecture-hall and are divided from it by sliding doors; each class-room is well lighted by a large three-light window, glazed with lead lights, and will have a plastered ceiling and cemented dado. The library adjoins the class-rooms and is similar in all respects. The buildings will be heated by Messrs. Bacon & Co. on their small-pipe principle. The buildings are designed in the Perpendicular style, and are constructed of stock bricks faced with Bracknell red bricks; the mullions to windows and all dressings are of Lascelles's concrete; the roofs are boarded and slated. The cupola, which rises to a height of nearly 60 ft., is covered with lead, and the sides with oak shingles. Mr. Brown, of Lynn, is carrying out the works, and Mr. Lock, of Norfolk-street, Lynn, is providing the stained glass. The buildings have been designed and are being carried out under the personal superintendence of Mr. Hatchard Smith, architect, of Moorgate Station-buildings, London, with Mr. Hilliam as clerk of the works.

Messrs. Crosby Lockwood & Co. have in active preparation and will publish, it is hoped, in the autumn, an extensive work on British mining by Mr. Robert Hunt, the well-known Keeper of Mining Records. The book will, we are informed, comprise a practical treatise on the metalliferous mines and minerals of the United Kingdom, dealing comprehensively with the theories of mineral deposits, the history of mines, their practical working, and the future prospects of British mining industry. The work will be fully illustrated.

The Late Earl of Beaconsfield. — In memory of the late Earl of Beaconsfield a simple memorial tablet of brass has been erected in the Church of St. Wystan, Bretby, Derbyshire, by the Countess of Chesterfield, as "a record of a much-prized friendship, and a lasting regret." The brass, which measures 2 ft. 4 in. by 2 ft., has been executed by Messrs. Thomas Pratt & Sons, Southampton-street, Strand.

Value of Land.—The *City Press* states that land in South London has increased enormously in value. At Norwood a plot which was valued at 500*l.* ten years ago is now worth 5,000*l.* And this is not exceptional.

New "Sportsman" Office.—The constructional ironwork in these premises, described in our last issue, was supplied by Messrs. Chas. Williams & Co., of the Ferry Iron Works, Cubitt Town.

TENDERS.

For the erection of infants' school, Bromley, Kent. Mr. Richard Creed, architect:—

Humphris, Sutton, Surrey	£1,518	0	0
Soanes, Bromley	1,398	0	0
Smith, Bromley-common	1,239	0	0
Arnaud & Son, Bromley	1,180	0	0
Crossley, Bromley	1,166	0	0
Balding, Bromley	1,150	0	0
Stewart, Wallington, Surrey	1,128	0	0
Payne, Bromley	1,120	0	0
Satchell, Bromley	1,112	1	8
Grubb, Bromley	1,105	0	0
Yates, Bromley-common (accepted)	1,071	2	0

For rebuilding the ancient tavern of the Old Five Bells, Bromley-by-Bow, for Messrs. J. Carter Wood & Co., The Artillery Brewery, Westminster. Mr. John Calder, architect. Quantities by Mr. Edward Crutchloe:—

Richards & Son	£3,385	0	0
Boyce	3,150	0	0
Calnan & Co.	3,073	0	0
Falkner	2,957	0	0
Curtis	2,900	0	0
Merritt & Ashby	2,900	0	0
Gregory	2,860	0	0
William King & Son	2,840	0	0
Crisp	2,783	0	0
Stiling	2,742	0	0

For the alterations to the Victoria Dock Tavern, Canning Town, for Messrs. J. Carter Wood & Co., The Artillery Brewery, Westminster. Mr. John Calder, architect. Quantities by Mr. Edward Crutchloe:—

Richards & Son	£555	0	0
William King & Son	415	0	0
Stiling	376	16	0

For extension to factory in course of erection for Mr. Fredk. Foster (Contract No. 2), Hoxton. Mr. Spencer W. Grant, architect, 63, Finsbury-pavement:—

Atherton & Latta (accepted)	£450	0	0

For the St. Leonard's-road Schools for the School Board for London. Mr. E. R. Robson, architect:—

Wood	£18,883	0	0
Boyce	17,700	0	0
Brass	17,513	0	0
Kirk & Randall	17,389	0	0
Grover	17,372	0	0
Jerrard	16,983	0	0
Shurmur	16,965	0	0
Perry & Co.	16,448	0	0
Harris & Wardrop	16,438	0	0
C. Cox	16,420	0	0
Atherton & Latta	16,200	0	0

For cabinet and counter fittings to the Nun's Head, Nunhead-green, for Mr. F. J. Johnson. Mr. W. H. Jervis, architect:—

	In pine.			In mahogany.		
Gill	£261	0		£291	0	
Lewis	196	0		246	0	
Russel	190	0		210	0	
Pierce	159	0		199	0	
Taylor (accepted)	186	0		196	0	

For alterations and repairs to No. 38, Park-lane, exclusive of decorations. Messrs. William Wallace & Flockhart, architects, 27a, Old Bond-street. Mr. F. Thomson, architect:—

J. McLachlan & Sons	£1,400	0	0!
Thos. Fox & Co.	1,089	0	0
W. & E. Curtiss	875	0	0
M. Manley	785	0	0
P. S. Robertson	764	0	0!

For warehouse, Lower Clapton. Mr. Tillett, architect:—

W. Shurmur	£693	0	0
Goodall	675	0	0

For the erection of nine houses at Walthamstow. Mr. W. A. Longmore, architect:—

F. & F. J. Wood	£9,178	0	0
Bentley	8,647	0	0
W. Shurmur	8,169	0	0
Reed	7,986	0	0
Morter	7,667	0	0
Fuller	7,510	0	0
Palmer & Sons	7,450	0	0
Parrish & Hawker	7,200	0	0

For building house and factory in Radford-road and Ward-street, Scothouse, Nottingham, for Mr. Wm. Walker. Mr. Charles Wright, architect. Quantities supplied:—

Wheatley & Maule	£2,150	0	0
Enoch Hind	2,056	0	0
Dudson Parish	2,018	0	0
Lynam & Kidds	1,965	0	0
Collinson	1,940	0	0
Joseph Caulton	1,930	0	0
Henry Vickers	1,887	0	0
George Smith	1,871	0	0
Baines & Turton	1,860	0	0
John Jelley & Co.	1,850	0	0
J. R. Morrison	1,845	0	0
William Taylor	1,730	0	0

For pulling down and rebuilding Nos. 54 and 56, King-street West, Hammersmith. Mr. George Saunders, architect. Quantities by Messrs. Franklin & Andrews:—

Scott	£6,197	0	0
Hunt	5,890	0	0
Jarrett	5,860	0	0
Adamson & Sons	5,789	0	0
Hall, Beddall, & Co.	5,784	0	0
Macey & Sons	5,775	0	0
Lucas & Son	5,773	0	0
Gibbs & Flew	5,755	0	0
Fish, Prestige, & Co.	5,690	0	0
Oldrey	5,500	0	0
Chamberlain Bros.	5,469	0	0
Nye	5,220	0	0

For alterations to London and South-Western Bank, Forest-gate Branch. Messrs. James & J. S. Edmeston, architects:—

Lucas & Son	£692	0	0
Atherton & Latta	675	0	0
Smith & Son	623	0	0
Bullterim	615	0	0
Cox	610	0	0
Hallock	545	0	0
Crisp	523	0	0

For general repairs, painting, &c., at Radnor Lodge, Now Wandsworth, for Mr. James Neal. Mr. W. P. Miller, architect:—

E. Dormer (accepted).

For two warehouses in Barbican. Mr. Bunkell, architect:—

Geo. Crabb (accepted)	£5,000	0	0

For new buildings and alterations to shoe factory at Leicester, for the Co-operative Wholesale Society (Limited). Mr. J. Tait, architect:—

Section No. 1.—Excavator, Bricklayer, Slater, Plasterer, and Stone Mason.

Jewsbury (accepted)	£3,091	0	0

Section No. 2.—Carpenter, Joiner, and Ironmonger.

J. Cox (accepted)	£2,520	0	0

Section No. 3.—Plumber, Glazier, and Painter.

Norman & Underwood (accepted)	£566	16	0

Section No. 4.—Ironfounder.

Illston & Arnold (accepted)	£533	14	6

For new Sunday School Memorial Hall at Leicester. Mr. J. Tait, architect:—

Section No. 1.—Excavator, Bricklayer, Slater, Plasterer, and Stone Mason.

J. Holmes (accepted)	£615	0	0

Section No. 2.—Carpenter, Joiner, and Ironmonger.

H. T. & W. Chambers (accepted)	£475	0	0

Section No. 3.—Plumber, Glazier, Painter, and Ironfounder.

Norman & Underwood (accepted)	£198	10	0

For gardener's cottage at Maplewell, for Sir W. H. Salt, bart. Mr. J. Tait, architect:—

Wesley (accepted)	£520	0	0

For rebuilding Nos. 107, 109, 111, and 113, Ossulston-street, Somers Town, for Mr. Colchester. Mr. Benjamin Tabberer, architect:—

Patman & Fotheringham	£4,785	0	0
Jarritt	4,550	0	0
R. Conder	4,550	0	0
Sabey & Son	4,498	0	0
Steel Bros.	4,460	0	0
Mark	4,430	0	0
Lawrence	4,389	0	0
Downs	4,342	0	0
Spencer & Co.	4,295	0	0
Jackson & Todd	4,075	0	0

For the erection of a small house and shop (exclusive of shop fittings), Markhouse-road, Walthamstow, Essex, for Mr. Marx Gross. Mr. W. F. Potter, architect:—

C. Dearing & Son, Islington	£520	0	0
F. & C. Hersee, Peckham	450	0	0
T. Probert, Walthamstow	440	0	0
R. Shaw, Leyton	390	0	0
G. Rayner, Walthamstow (accepted)	382	0	0

For additions and alterations, Wooburn House, Bucks. Mr. Arthur Vernon, architect, 26, Great George-street, Westminster, and High Wycombe, Bucks. Quantities by Mr. W. L. Vernon, Hastings:—

Holland & Hannen	£4,287	0	0
Woodbridge	3,994	0	0
Hunt	3,839	0	0
Silver & Son	3,794	0	0
Loosley	3,600	0	0

For putting in new shop-fronts and making other alterations to premises, Nos. 21, 22, 23, and 24, Fleet-street, Coventry, for Mr. F. W. Poole. Mr. Herbert W. Chattaway, architect, Trinity Churchyard, Coventry:—

G. Storer, Coventry	£675	0	0
C. Haywood, jun., Coventry	328	0	0
J. Brown, Coventry	312	0	0
F. Makepeace, Coventry	309	0	0
A. Waters, Coventry	307	0	0
T. Mayo, Coventry (accepted)	305	0	0

For pulling down old premises and building new shops in Market-square, Bromley, Kent, for Messrs. Collins. Mr. E. J. Thomas, architect. No quantities:—

			Allowed for Old Materials.		
Priestly	£3,450	0		nil.	
Payne	3,348	0		£100	0
Crossley	3,255	0		45	0
Redman	3,220	0		65	0
Arnaud & Son	3,155	0		nil.	
Jones	2,917	0		100	0
Balding (accepted)	2,818	0		130	0

For alterations and repairs to a warehouse, No. 11, Curtain-road, Finsbury, for Messrs. B. Cohen & Sons. Messrs. Hammack & Lambert, architects:—

T. Boyce	£1,470	0	0
J. H. Johnson	1,307	0	0

For the rebuilding of the Black Horse public-house, Bethnal-green, for Mr. Zabell. Messrs. Hammack & Lambert, architects:—

J. Walker	£1,049	0	0
R. Marr	995	0	0
Steel Bros.	899	0	0
W. R. Cubitt	848	0	0
J. H. Johnson	837	0	0
S. W. Hawkings	708	0	0

For additions, &c., at Hill House, Ipswich, for Mr. J. C. Ransom. Mr. Brightwen Binyon, architect. No quantities:—

Girling	£3,560	0	0
Grimwood & Sons	3,347	0	0
Bennett Bros. (accepted)	3,175	0	0

For additions to hotel, Beckenham, Kent. Mr. H. H. Collins, architect. Quantities supplied:—

Astell	£7,882	0	0½
Cooper	7,596	16	7
Graham	7,393	0	0
Grimwood & Sons	6,967	0	0
Burrows	6,830	0	0
Abraham	6,657	0	0
Bentley	6,489	0	0
Merritt & Ashby	6,333	0	0
Croaker	5,534	0	0

For new work-room, &c., at Limes Villa, New Cross, for Mr. F. Swinburn. Mr. T. Hunt, jun., architect:—

Rodwell	£142	0	0
Mark Redman	138	0	0
H. L. Holloway (accepted)	135	0	0

For the erection of market hall, public offices, and shops at Ebbw Vale, Mon., for the Ebbw Vale Market Company (Limited). Mr. E. A. Johnson, Abergavenny, architect:—

				Extra for white pressed bricks.		
E. Stephens, Abergavenny	£2,760	0	0	£107	3	4
J. G. Thomas, Abergavenny	2,700	0	0	113	0	0
T. Foster	2,521	0	0	96	10	0
Morgan & Evans, Pontnewydd	2,500	0	0	—		
Bowers & Co., Hereford	2,500	0	0	112	10	6
David Davies, Cardiff	2,490	0	0	96	9	0
John Williams, Merthyr	2,480	0	0	—		
Jones & Son, Newport	2,449	0	0	100	0	0
J. Isaac, Swansea (accepted)	2,300	0	0	128	12	0

For the erection of a mission room adjoining the Church of St. Barnabas, St. Peter Port, Guernsey. Messrs. Noltey & Trollope, architects:—

Gervase Peek (accepted)	£1,130	10	0

For alterations to St. Sebastian's Vicarage, Wokingham, Berks, for the Rev. A. Carr. Messrs. Morris & Stallwood, architects, Reading:—

R. Conder	£1,610	0	0
Silver, Sons, and Filewood	1,447	0	0
A. Sheppard	1,318	0	0
Joseph Norris	1,222	0	0
Botterill	1,194	0	0
Spear & King	1,041	0	0

For repewing and restoration of St. Lawrence Church Towcester, Northamptonshire. Mr. J. L. Pearson, architect:—

Thos. Heath, of London and Towcester (accepted).

For alterations and repairs to residence in Harrington Gardens, South Kensington. Mr. W. H. Collbran, architect, 94, Gloucester-road:—

McLachlan & Sons	£1,558	0	0
Martin, Wells, & Co.	1,300	0	0
H. Smith	1,029	0	0
Cowland & Co.	979	0	0
J. W. Falkner	973	0	0
Toten & Sons	970	0	0
W. H. Smith	920	0	0
Styles & Holdstock	862	0	0

For residence at Westcombe Park, Blackheath, for Mrs. E. A. Malings. Mr. W. H. Collbran, architect. Quantities by Mr. W. H. Strudwick:—

Higgs & Hill	£2,344	0	0
Martin, Wells, & Co.	2,185	0	0
Cowland & Co.	2,158	0	0
Perry & Co.	2,089	0	0
Eyers & Sampson	2,087	0	0
Jerrard	2,073	0	0
Huey	2,063	0	0
Tongue	1,980	0	0
Nightingale	1,977	0	0

For alterations to Nos. 93 and 95, Fulham-road, for Messrs. Bowman & Co. Mr. W. H. Collbran, architect:—

Picken	£929	0	0
H. Smith	753	13	0
Styles & Holdstock	619	0	0
Wilkins	613	0	0
W. H. Smith	532	0	0

For alterations and repairs to residence in Harrington-gardens, South Kensington. Mr. W. H. Collbran, architect:—

Higgs & Hill	£1,390	0	0
Toten & Sons	1,383	0	0
H. Smith	1,227	0	0
Cowland & Co.	1,227	0	0
W. H. Smith	1,221	0	0
J. W. Falkner	1,210	0	0

For alterations and repairs to No. 82, 84, and 90, Fulham-road. Mr. W. H. Collbran, architect:—

Oliver	£425	0	0
Toten & Sons	405	0	0
W. H. Smith	397	0	0
H. Smith	389	0	0

For the erection of stables, Gloucester-grove, South Kensington, for Mr. R. King. Mr. W. H. Collbran, architect:—

Toten & Sons	£398	0	0
R. Smith	397	0	0
Andrews	375	0	0
W. H. Smith	374	0	0
H. Smith	365	0	0

For works required in the formation of road, drains, &c., about 170 yards long, in laying out the White Swan Estate, Birstal, for building purposes, for the Birstal Local Board:—

J. Bentley, Speedwell-street, Woodhouse Carr, Leeds	£1,796	5	0
Wm. Barrowclough, Birstall, near Leeds	1,761	4	0
John Slinger, Cleckheaton	1,750	0	0
J. & T. Oldroyd, Batley	1,530	2	11
G. & R. Naylor, Scholes, Cleckheaton	1,487	0	0
Wm. Harrison, 154, Bradford-road, Huddersfield	1,317	2	6
Brier, Sons, & Wilson, Savile Town, near Dewsbury	1,300	0	0
Egan & Pearson, Manningham-lane, Bradford	1,214	10	0
Alfred Law, Birstal, near Leeds	1,164	7	8
Matthew Hall, Dudley-hill, near Bradford	1,055	8	2
James Rhodes, Birstall, near Leeds	1,027	9	5
Parker & Sharp, Birstall, near Leeds (accepted)	1,100	0	0

For shop and premises, Bromley, Kent. Mr. Fred. Stocker, architect:—

Bulled	£998	10	0
Wood	987	0	0
Kennard	977	0	0
Jones	920	0	0
Hunt & Challis	910	0	0
Loader	895	0	0
J. Baxter	880	0	0
Marr	857	0	0
Burnett	795	0	0
Cox	794	10	0
Holloway	770	0	0
Stayner (accepted)	737	0	0

For completing eight houses, Tournay-road, Walham-green, for the Middlesex Land Company, Limited. Mr. George Edwards, architect:—

Long	£1,930	0	0
Scharien & Williams	1,911	0	0
Green	1,810	0	0
Hunt & Freeman (accepted)	1,660	0	0

For alterations to No. 78, Westbourne-grove, for the Albion Bakery Company, Limited. Mr. George Edwards, architect:—

Sage	£630	0	0
Reading	594	0	0
Drew & Cadman	575	0	0
Smith	570	0	0
Stimpson & Co.	545	0	0
Jay	533	0	0
Scharien & Williams (accepted)	510	0	0

For alterations to No. 19, Soho-square, for Messrs. Burroughes & Watts. Mr. Rowland Plumbe, architect:—

Hayward & Sons	£2,870	0	0
Goodman	2,787	0	0
R. Conder	2,760	0	0
Bangs	2,600	0	0
Lawrence	2,548	0	0
Ashby Bros.	2,486	0	0
Patman & Fotheringham	2,473	0	0
Adams & Son	2,433	0	0
Longmire & Burge	2,335	0	0

For the erection of provision shop, warehouses, and dwelling-house at Sleaford, for Mr. Brewitt. Mr. J. R. Benstead, architect:—

Newton, Helpringham	£1,350	0	0
Atcliffe, Horncastle	1,100	0	0
Banks & Co., Sleaford	1,080	0	0
Wallis & Son, Spalding (accepted)	1,040	0	0

TO CORRESPONDENTS.

W. M.—H. S. W.—J. W. M.—T. H.—J. H. S.—J. T.—C. J. F.—J. P.—E. A. J.—W. T. H.—L. & Son.—J. S. G.—A. W. C.—W. H. C.—S. H.—W. K.—T. P. & Son.—W. H. G.—R. B. & Son.—L. & Co.—G. M.—W. H. J.—J. G. C.—A. & G.—H. B.—H. & I.—W. A.—T. H. W. & Son.—D. Y. O.—F. C.—A. V.—H. W. C.—E. H. C.—H. T.—E. W. H.—Ex-Trade Unionist.—J. B.—W. P.—W. T. T.—F. & F.—P. E. & Co.—A. H. (Mr. Meyers's pamphlet has been mislaid, and publisher's name is not known).—J. G. B. (inquire at Patent Office).—J. B. H. (we cannot advise in private disputes. Take advice).

Correspondents should address the Editor, and *not* the Publisher, except in cases of business.

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

NOTICE TO ADVERTISERS.

Persons advertising in the *Builder* may have REPLIES ADDRESSED TO THE OFFICE 46, Catherine-street, Covent-garden, W.C., FREE OF CHARGE.

Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.

CHARGES FOR ADVERTISEMENTS.

SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE, AND GENERAL ADVERTISEMENTS.

Six lines (about fifty words) or under ..... 4s. 6d.
Each additional line (about ten words) ..... 0s. 6d.

Terms for Series of Trade Advertisements, also for Special Advertisements on front page, Competitions, Contracts, Sales by Auction, &c. may be obtained on application to the Publisher.

SITUATIONS WANTED.

FOUR Lines (about THIRTY words) or under ..... 2s. 6d.
Each additional line (about ten words) ..... 0s. 6d.

PREPAYMENT IS ABSOLUTELY NECESSARY.

*** Stamps *must not* be sent, but all small sums should be remitted by Cash in Registered Letter or by Money Order, payable at the Post-office, Covent-garden, W.C. to

DOUGLAS FOURDRINIER, Publisher,
Addressed to No. 46, Catherine street, W.C.

Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent

TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum, PREPAID. Remittances payable to DOUGLAS FOURDRINIER, Publisher, 46, Catherine-street, W.C.

Best Bath Stone.
WESTWOOD GROUND,
Box Ground, Combe Down,
Corsham Down,
And Farleigh Down.
RANDELL, SAUNDERS, & CO., Limited,
Corsham, Wilts. [ADVT.

Bath Stone.
Facilities for selection and quality unequalled, having upwards of
350,000 Feet Cube
In Stock of all known descriptions.
PICTOR & SONS, Box, Wilts. [Advt.

Doulting Freestone and Ham Hill Stone of best quality, in blocks, or prepared ready for fixing. An inspection of the Doulting Quarries is respectfully solicited; and Architects and others are CAUTIONED against inferior stone. Prices, delivered to any part of the United Kingdom, given on application to CHARLES TRASK, Norton-sub-Hamdon, Ilminster. Somerset. — Agent, Mr. E. WILLIAMS, 73, Charlotte-street, Portland-place, W. [ADVT.

Doulting Freestone,
HAM HILL STONE,
BLUE LIAS LIME
(Ground or Lump),
Of best quality, supplied from their own Quarries and Kilns by STAPLE & HANN, Stoke, Ilminster. Agent, Mr. H. MITCHELL, 5, Augustus-road, Hammersmith, London, W. [ADVT.

Asphalte.
Seyssel, Patent Metallic Lava, and White Asphaltes.
M. STODART & CO.
Office:
No. 90, Cannon-street, E.C. [ADVT.

Asphalte.—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 38, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds and milk-rooms, granaries, tun-rooms, and terraces. [ADVT.

Immense quantities of
DRY WAINSCOT,
DRY MAHOGANY,
DRY WALNUT,
in all thicknesses.
B. J. HUDSON & SONS,
Whitfield-st., W., and Great Peter-st., S.W.
London. [ADVT.

"Barnet, Jan. 8th, 1883. DEAR SIRS,—We are pleased to say that the Cowl you put on chimney at —— appears to have cured its smoking, and we now want you to fix fourteen more, the same as last . . . . to Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16, and 17.—Yours, &c., Messrs. EWART & SON." BROOKING & NELSON.
The successful Cowl with the "Empress" Smoke Cure. [ADVT.

MICHELMORE & REAP,
Manufacturers of
CHARLES COLLINGE'S PATENT
COLLINGE'S PATENT HINGES,
LEVER, SCREW, & BARREL BOLTS,
Self-Acting "FALL DOWN" GATE STOPS,
and IMPROVED GATE FITTINGS of every Description.
36A, BOROUGH ROAD,
LONDON, S.E.
Discount to Builders.
Illustrated List two stamps.

ZINC ROOFING.
F. BRABY & CO.,
LONDON, LIVERPOOL, GLASGOW.
VIEILLE MONTAGNE BRAND.
NO SOLDER.
NO EXTERNAL FASTENINGS.
PARTICULARS ON APPLICATION. CHIEF OFFICE: 360, EUSTON ROAD, LONDON.